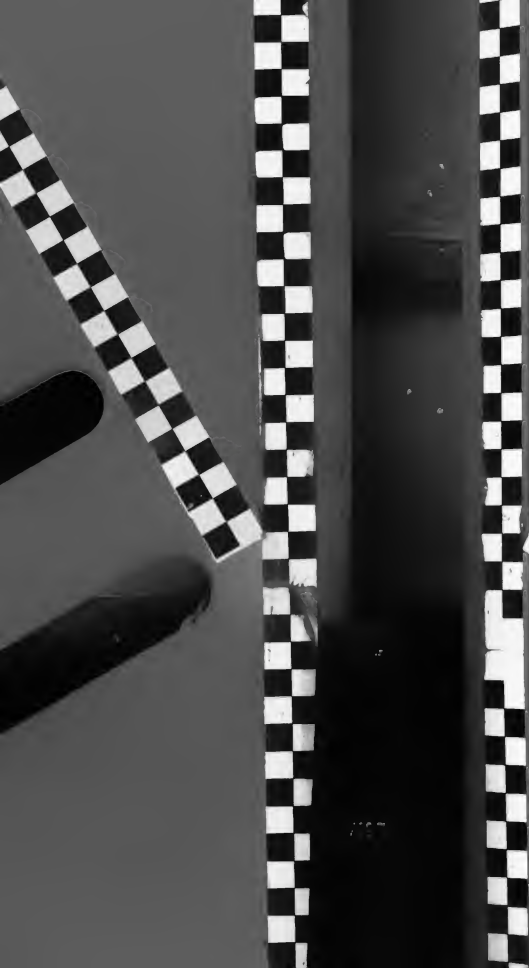


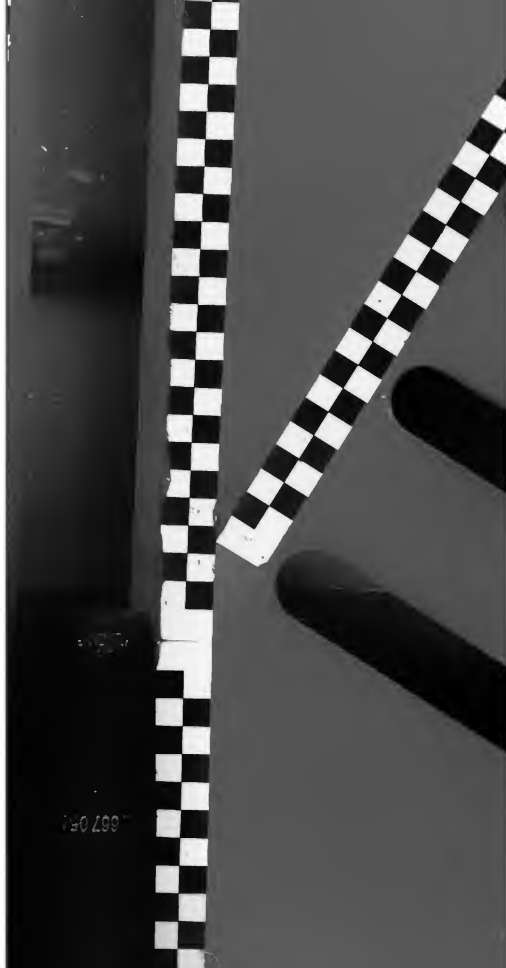
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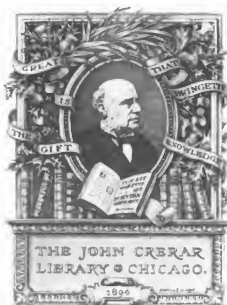


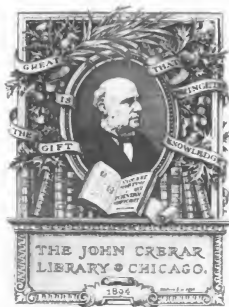


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TEXTILE COLORIST.

A MONTHLY JOURNAL

DEVOTED TO

Practical Dyeing, Bleaching, Printing;
AND
FINISHING.

Dyes, Dyestuffs and Chemicals as Applied to Dyeing.

Vol. II, 1880.

PUBLISHED AT THE OFFICE OF THE

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DR. M. FRANK, Manager,

No. 506 Arch St., Philadelphia, Pa.

H. B.

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TEXTILE COLORIST.

Entered according to Act of Congress, in the year 1880, by DR. M. FRANK, in the Office of the Librarian of Congress at Washington, D. C.

Vol. 2.

Philadelphia, January, 1880.

No. 13

On Calico Printing.

BY DR. M. HASENCKLEVER.

(Continued from page 173.)

INDIGO PRINTING.

Indigo is one of the oldest blue dyes known, and has been used for several thousand years. It is prepared from several species of *Indigofera*s by extracting the fresh and dried leaves. East India and the neighboring islands are the principal source of this valuable dye—only one kind, the *Indigo tinctoria*, has been cultivated in France and the southern European countries, but it stands far back in quality to the product derived from the India plants. The indigo as it is sent in the market, contains, besides the blue coloring matter, several other substances. An analysis of a French chemist, M. Chevreul, of Guatemala indigo, shows the following different substances:

Indigotine,	45 per centage.
Gummy matters,	12 " "
Resinous "	36 " "
Carbonate of lime,	2 " "
Iron and Alumina,	2 " "
Sand,	3 " "

These quantities of course vary much in the different brands.

The crude indigo has to undergo several processes before it is able to be fixed on the fibre. For wool dyeing and printing it is dissolved in strong sulphuric acid, and precipitated with salt and soda, thus forming a soluble substance, the sulphindigotic acid or sulphate of indigo. For cotton dyeing and printing it is prepared differently. The blue coloring matter which is insoluble in the ordinary solvents, has to be reduced to indigo white, which by adding different substances, becomes soluble and fit for applying on cotton. We have a great many reducing agents for this process: metals, metallic oxides, alkaline metals, sulphurets, phosphorets and arsenurets. For calico printing we mostly use tin. The indigo is reduced by a solution of stannate of soda and precipitated with an acid solution of chloride of tin. The precipitate is a mixture of stannous oxide and indigogen.

The preparing and process depends of course on the various styles of printing. One of the oldest methods is the "Fayence printing," to produce blue designs on white ground. It is said to have been known in olden times in India, and was introduced in Europe at the beginning of the 18th century. The indigo is ground to a very fine powder and mixed with copperas and then printed by block or roller on the cloth. By applying milk of lime and copperas solution afterwards, the indigo blue is reduced to indigo white, which penetrates the fibre and changes again by action of oxygen of the atmospheric air to blue and gets insoluble. By printing the prepared indigo white directly on the cloth, the so-called pencil blue is obtained.

Schutzenberger published a few years ago a new method of re-

ducing and dissolving indigo. He mixes 20 lbs. very finely powdered indigo with 5 gallons strong caustic soda, then adds 15 gallons hydrosulphite of soda, heats up to 165° F. and keeps it on this temperature for about 15 to 20 minutes.

The hydrosulphite solution is prepared by treating bisulphite of soda solution in a closed vessel with granulated zinc. After one hour standing an excess of milk of lime is added to the solution which precipitates the zinc salt. The whole mixture is diluted with some water and filtered or decanted. It is necessary that the whole operation should be carried out as much as possible with exclusion of air.

This method has not yet succeeded to replace the tin reduction which is generally used in calico printing. A good indigo pulp ready for printing should contain:

Ground indigo,	10 per centage.
Dry caustic soda,	6 " "
Tin crystals,	8 " "
Gum senegal,	20 " "
Water,	56 " "

The preparation of this mixture is very simple. Finely ground indigo is heated with caustic soda solution and tin crystals. On adding muriatic acid to the mixture a combination of white indigo and stannous oxide is precipitated which is washed and thickened with gum.

Orpiment or sulphide of arsenic is very often used for reducing indigo, although the action only takes place at boiling heat. The indigo is boiled with caustic soda or potash and the orpiment gradually added; after one hour's more boiling a little more caustic soda is added, allowed to settle and thickened with gum paste. An addition of a little spirits of turpentine is considered an improvement to the mixture.

Copperas alone and together with orpiment are also sometimes used for these styles. After printing, the pieces are dried in a warm room and then passed successively through a bath of lime, copperas and soda three times.

Spirit printing, so-called, on account of the addition of tin spirits,—a solution of tin in muriatic and nitric acid, to the colors gives several shades with dye stuffs—logwood, peach wood, persian berries, etc. These colors are not very fast, and therefore not to be very well recommended. One of the fastest spirit colors is the black, which is a mixture of logwood and iron solution, thickened with starch. For cheaper goods, this logwood black is frequently used. The logwood with an addition of a little copperas is boiled with starch and allowed to cool, when permanganate of iron is added. The quantity of the latter is about one-tenth of the quantity of logwood liquor at 8° T. used. By addition of tin spirits to logwood liquor a purple color can be obtained, which, however, is not of a good quality in brightness or fastness.

The pieces, printed with these spirit colors (also called fancy colors,) are dried in a warm room for a few days and then passed through water, whereby the color is fixed.

Resists or reserves which are used in printing to prevent the cloth to accept the color are used, if the cloth shall be dyed afterwards, and some places in it to remain untouched by the color. These substances can be of different nature. We use bees-wax, paraffine, mixtures of rosin and tallow, tallow and gum, copper salts and pipe-clay, etc., which substances are printed on the cloth, thus preventing the color to come in contact with the fibre.

For mordant resists which are principally used in madder dyeing to keep certain places white, the printer uses lime juice, tartaric or citric acid. These substances, when printed on the mordanted cloth combine with the alumina or iron oxides on these places, where the resist is printed, to soluble salts, which do not accept the color.

Copper salts and fatty substances, principally used for indigo resists, are mixed together and printed on the places, which shall remain white or which shall produce lighter shades than the rest of the color. The resist mixture, either total or partial resist which is printed on the cloth, can also contain an alumina or iron mordant, in order to produce a new color by passing it through a vat of madder, dyewoods, etc.

For partial resists, printers use sometimes a little soft soap instead of fatty substances in combination with copper salts and thickening. For total resists a more solid matter is required, which is obtained by mixing brown sugar of lead and sulphate of copper with thickening.

The pieces are afterwards washed and leave white or lighter colored designs on the cloth where the resist has been put on.

Discharge styles are used in two different manners. We can first take the mordant off on certain places by printing with dilute acid, or acid mixtures; the places where the mordant thus was taken away remain white in dyeing. The materials used for this purpose are tartaric, citric, phosphoric, arsenic, oxalic acid, chloride of zinc, etc. It ought to be understood, that only such acids can be taken in this process which do not injure the fibre or the rollers, and which are easily soluble in water. These ingredients are thickened with gum senegal and pipe clay; for very heavy styles also British gum and flour. Another discharge can be obtained on the already dyed cloth. For indigo, we generally take chromic acid, chloride of iron, and the Mercer's solution—a mixture of red prussiate of potash with potash. For madder, generally chlorine is used. To obtain white designs on turkey red, the places are printed with an acid mordant and then passed through chloride of lime solution. These discharge agents can also at the same time contain a new mordant for other colors.

Printing with metallic colors is also a method of some value to the printer. A chemical action takes place on the fibre which produces a fast and pretty bright color. Iron, manganese and chromium are the principle metals for this purpose. For buff color, nitrate or sulpho-nitrate of iron is either padded on the cloth, or the cloth is run through a moderate strong solution of above. The cloth is afterwards passed through lime water or soda solution. If white designs on the iron buff should be required, some weak acid (oxalic

or tartaric acid) is printed on the cloth, which turns the iron oxide into a soluble salt and can easily be washed off. The so-called Prussian blue is obtained by padding the cloth with a solution of iron salts, and after drying, sweetened with lime water. Then the cloth is passed through a slightly acidulated solution of yellow prussiate of potash. To obtain white designs on the blue ground, caustic alkali mixed with thickening is printed on and then passed through a weak acid solution, tartaric or oxalic acid.

Manganese colors are obtained by padding a thickened solution of chloride of manganese on the cotton; the cloth is then dried and passed through cold soda solution, which leaves the manganese on the fibre in form of an insoluble oxide. Tin salts printed on this cloth, leaves white designs on a brown or bronze ground.

Chrome colors are fixed on the cloth, by first padding with acetate of lead, then passing through carbonate of soda solution, and at last through bichromate of potash. A more orange shade is obtained by passing the yellow through hot lime water. A mixture of chrome yellow with indigo will form a green color. Pigment colors are those which are only mechanically fixed on the cloth by means of albumen. For delicate colors like ultramarine, chrome green, (guignet green), the printers generally use egg albumen, for darker colors (chrome yellow and orange, and iron ochre, etc.) the blood albumen is used.

Aniline colors are also sometimes fixed by albumen in combination with gum tragacanth and sometimes starch paste and glue water. The colors are mixed with the thickening to a suitable paste, printed and dried. The albumen coagulates and leaves the whole color mixture in a perfectly insoluble state.

(To be continued.)

Description of Dyestuffs and Determination of their Commercial Value.

BY H. ENDEMANN, PH. D.

(Copyrighted.)

(Continued from page 180.)

It is only left now to mention those methods which are based upon the determination of the amount of certain chemicals, which are able to completely destroy the coloring matter.

These methods are the easiest of execution, and for this reason much more frequently applied than those described before, though in point of reliability and accuracy they are excelled by many of the former.

They are first based upon the assumption that concentrated sulphuric acid, together with Nordhausen oil of vitriol dissolve only the blue and carbonize all other organic matter present. In how far this actually is the case has never been examined, and could only be proved by the treatment of all the constituents of indigo separately in a like manner, and examining the solution for indigo-oxidizable organic matter by the same method as the indigo is proposed to be tested.

The danger of overrating the quality of the indigo is naturally greatest with those samples which are of poorer quality, and in which organic impurities abound. The substances proposed for the

destruction of indigo blue are chlorine, chromic acid, ferricyanide of potassium and permanganate of potash.

According to Schlumberger's method improved by Penny, the examination is conducted as follows:

A solution of potassium bichromate containing 7.66 grams of this salt in 1 litre is prepared. One cubic centimeter of this solution will exactly destroy $\frac{1}{11}$ gram of pure indigo blue or 10 c. c. of a solution of 1 gram of indigo in 1 litre of water.

The sample of indigo to be examined is then carefully pulverized and sieved through a bolting cloth, taking especial care, that anything remaining on the cloth is reground and sieved until the whole of the sample has passed the cloth. After carefully mixing the sieved indigo a smaller sample is taken, from which such quantity as is to be taken for examination can be weighed off.

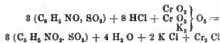
One gram of this is then brought into a small porcelain dish and covered with 12 grs. of Nordhausen oil of vitriol, it is then stirred well by means of a glass rod and allowed to stand in a warm place for 24 hours, or a shorter time at a higher temperature, which however, in no case should exceed 50° C. The indigo blue is hereby converted into a sulphonic acid, which is soluble in water. When the conversion is complete, water is added, and the solution thus produced is filtered to remove certain extractive substances, which, during the following operations, would seriously interfere with the accurate determination of the blue. The residue on the filter must, after washing with water, be perfectly free from the blue dye, otherwise the conversion has been incomplete, which would necessitate the treatment of another new sample.

The blue solution is then diluted to 1 litre. 100 c. c. of this we then measure out by a pipette brought into a flask and, after the addition of 10 c. c. hydrochloric acid, are gradually mixed with the chromate solution. This is contained in a burette to allow an accurate measurement of the volume of chromate solution required for complete oxydation of the indigo blue present. The point, when the oxydation is complete is not easy to determine on account of the fact, that the solution of the chromium sesquioxide salts are green, and it frequently happens that in order to obtain an accurate result the operation is to be repeated. The point when the addition of chromate solution is to be discontinued is marked by the disappearance of the greenish color of the fluid and the appearance of an orange yellow shade.

The uncertainty of accurate observance of the point of complete oxydation has been the cause, that other substances have been proposed to be used in the place of the potassium chromate like potassium chlorate, but in this case the fluid must be hot if the reaction shall succeed, or potassium permanganate. That of the latter no solution of standard strength can be kept has been mentioned before, as well as, also the fact, that the strength of this solution has to be redetermined whenever it is to be used; instead, however, to determine its strength in the ordinary way by means of an iron proto salt it is just as well and generally more convenient, to determine its value based upon the titration of the pure indigo blue or some standard sample which is kept on hand for this purpose.

Other and older methods on the same plan, like the use of chloride of lime solution, which has been abandoned on account of

the unavoidable loss of chlorine. It would be useless to describe in detail, or even to mention. The reaction which takes place in all these cases consists in the oxydation of the indigo sulphonic acid to sulphatanic acid. The reaction takes place with quantitative accuracy, a case of not frequent occurrence in organic chemistry. The following formula explains the process which takes place when the oxydation is produced by bichromate of potash and hydrochloric acid.



Of later propositions to determine the value of indigo, two should be mentioned on account of superior accuracy, which may be attained according to their authors.

C. H. Wolf proposes to determine the quality of an indigo by means of the spectroscope, in a manner which he has successfully applied for the quantitative determination of other substances, and which is based upon the determination of the point of extinction of certain spectroscopic lines by attempted change of the strength of a solution or the thickness of the layer which is examined.

Houton-Labi Uarlriere's colorimetric method has been considerably improved by the use of a colorimeter constructed by J. Salleron, in Paris, and by the discarding of the use of Nordhausen oil of vitriol, which is said to be the cause of the purplish shade, and the substitution of ordinary oil of vitriol as a solvent.

Tantin, who reports on this method, gives the results obtained by him in testing several varieties of indigo as follows:

Bengal,	51.48 — 71.40 per centage of indigotine.
Madras,	30.79 — 39.07 " "
Java,	64.08 — 67.05 " "
Vellore,	44.46 — 49.22 " "
Kurpah,	61.27 " "
Guatemala,	65.62 " "
Oude,	47.08 " "
Nicaragua,	53.17 — 64.34 " "

(To be continued.)

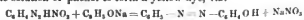
On the Various Azo Colors now Sold in Commerce.

BY JAMES STERBINS, JR.

Under the head of Azo-colors, I would have understood those bodies obtained by the union of a diazo compound, as, for instance, diazobenzol nitrate ($C_6H_5N_2HNO_3$) with either an amine (as aniline $C_6H_5NH_2$), amide or phenol (as carbolic acid C_6H_5OH).

Gries has shown that whenever one of those bodies come in contact with a diazo compound, they unite in such a way that the chromophor ($-N=N-$) is common to both; also, that the colors so obtained are the redder the higher their molecular weight.

For example, diazobenzol nitrate unites readily with an alkaline solution of phenol to form a yellow dye, viz:



This reaction shows how the chromophor $-N=N-$, joins the two bodies together, forming one; and this example may be applied to nearly all the other colors, which I will describe as I go on.

Keeping these points in view, it can readily be understood how

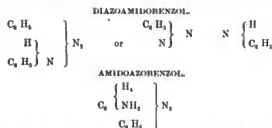
easy it is to obtain the desired shades of color, provided you take as your basis a compound of known composition and color.

These points being now clear, I will proceed to describe the various colors, each under its own group, and I think it will be seen as I go along how each color agrees with the above-stated rules.

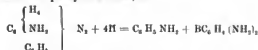
Among the first of these interesting compounds, may be mentioned amidazobenzol. This is obtained by treating pure diazamidobenzol in alcoholic solution with $\frac{1}{10}$ or $\frac{1}{5}$ its weight of aniline hydrochlorate ($C_6H_5NH_2.HCl$), and allowed to rest for two or three days.

The so-obtained dark brown solution is next mixed with water, which precipitates the amidazobenzol in an impure state; it is then heated with a little hydrochloric acid, which separates it from all traces of diazamidobenzol. The dark violet-brown needles of the hydrochlorate thus obtained ($C_6H_5-N=N-C_6H_5NH_2.HCl$) are recrystallized several times from dilute hydrochloric acid and the base set free with ammonia, which is also purified by crystallization from alcohol.

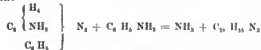
This compound may likewise be produced by the action of diazobenzol-sulphate on an alcoholic solution of aniline hydrochlorate, or by passing a stream of nitrous acid through a warm solution of aniline dissolved in alcohol. All these methods are based on the interesting change of diazamidobenzol to its isomer amidazobenzol, viz:



The amidazobenzol is a weak, monatomic base, of which its salts are decomposed by boiling with water. They are mostly red or violet colored. In acid solutions they are intensely red, and are only sparingly soluble in water. Reducing agents, such as tin and hydrochloric acid, split the base up, forming aniline ($C_6H_5NH_2$) and beta phenylendianiline, viz:



By distillation with peroxide of manganese and sulphuric acid, chrome is formed. By heating equal molecules of amidazobenzol and aniline hydrochlorates with double their weight of alcohol, $160^\circ C$, the hydrochlorate of a base ($C_{12}H_{13}N_3$) is formed, which is called Azodiphenyl blue. It is formed according to the following reaction:



Although the amidazobenzol is a pretty dye, yet it has not till recently been employed in commerce, partly owing to its insolubility in water and partly by its not adhering readily to the fibres

impregnated with it. However, these difficulties have now been surmounted by a German chemist, who in his patent describes a process for converting this body into its sulpho-acid, thus rendering the dye both soluble in water and fast.

(To be continued.)

History of Aniline Dyes.

(Copyright 1878.—All rights reserved.)

BY P. PRUNIER, D. S.

(Continued from page 181.)

Pulverization of the Raw Material.—The pulverization of the raw red is an important matter in different points of view. In the first place, it is important to have pulverized it as well as possible in order that the dissolution of the red may be easily done, and as completely as possible. This substance is very difficult to grind, being deliquescent. According to the perfection of the mills, there can be ground more or less of this material, and with less dust lost and scattered over the workmen. We know, that mills, even the most perfect, always permit the escape, more or less, of a small quantity of material in powder, which we can easily see is among the most dangerous.

The manufacturers or foremen, charged with the control or the direction of these factories, have a habit of recommending to the workmen to cover their mouths and noses with a handkerchief. This precaution is not very efficacious, since this dust is hygrometric, and moistens the handkerchief, and little by little, charge it with this matter. The result is poisoning, or at least the development of painful ulcers on lips and face.

Engineers or chemists charged with the direction or superintendence of this work have sought to abolish this dangerous operation of grinding, and consequently the casting of the material coming from the retorts, whence arises the necessity of pulverization.

We have succeeded in avoiding this dangerous operation by hydration, which can be easily worked in the new apparatus of which I have spoken, and which will be described farther on.

Raw red is, then, when once pulverized, purified by one of the following operations, or to speak more correctly, transformed into hydrochlorate of rosaniline and then crystallized.

(To be continued.)

Chlorozone.

BY M. EMILE LE FRANÇ.

The TEXTILE COLORIST has last year reported the discovery of chlorozone as a new bleaching agent, superceding chloride of lime in quality, economy and simplicity.

These claims of the patentee have been verified and tested practically in this country to a certain extent. Parties having used it carefully and comparatively assert its superiority over chloride of lime. Apparently, this last ingredient seems cheaper in figuring the first cost without estimating the beneficial results, such as softness, pure whiteness, unalterability and labor-saving produced by chlorozone. But having personally tested the material and calculated on the relative results, we do not hesitate to admit that chlorozone surpasses the chloride of lime whenever a fine bleaching is required. Be-

sides the decided advantages of various qualities over the old process, in the production of mellowness and stability of the bleach, especially in cotton, which chloride of lime so often renders harsh and changeable under atmospheric influences, chlorozone offers the important suppression of the tedious and injurious preparation of chloride bath.

Frequently imperfect manipulation and proportion in chloride baths create defects and inferiorities in goods which are not always accounted for. Mill-owners or managers are not always able to control the preparation in its right condition; roughness or thoughtlessness of an operative causes often great imperfections in the products. Hence, losses and dissatisfaction.

This dependance and risks are removed by chlorozone. It comes to the bleaching-room in a clear liquid form and which only requires a simple dilution in a given volume of water. Generally, the bath is made of one part of chlorozone to fifty parts of water. At 10 cents per pound it will cost about 4 cent per gallon; but as the bath can be used once again, the price may be reduced to 1 cent per gallon of liquor. On this base of cost the chloride of lime bath may appear considerably cheaper, but if the saving, labor and surplus qualities are estimated as an offset, chlorozone will be found the cheapest in the long run.

The philosophy of chlorozone rests on true principles. It is constituted from a combination of the oxygenated elements of the air, called ozone, with alkaline agents similar to those entering in the growth of vegetable fibres.

Ozone is a disinfecting and discoloring agent which being combined with alkaline bases saponifies intercellular matters, and penetrates into the filament. Its power is not destructive, as the hyperchlorure generated violently by evolving through lime. It is fortifying, and the tenseness of the fibre acquires more than it loses by the contact. Brittleness and harshness of fibre are produced by decay or crystallization of albuminous matters combined with silica. The oxidation of air acts on fibrous material bleached by chloride of lime as it does on lime water. It creates with the astringent salt a vitrious coating of calcium, the well known metal. Hence, the various defects invisibly attached to fabrics, which have not been radically freed from deposits, and the discoloration worked in by time.

No such destructive operation can take place in the bleaching by chlorozone, for the simple reason that there is no element for oxidation nor deposits of salt in its composition.

This composition is compounded from ozone, chloridric acid and alkalies brought in combination by air pumps and injectors under heat. The process requires a special apparatus and a certain skill in chemistry to conduct it successfully.

There was one at the Paris Exposition but its object being not well understood, no great attention was paid to it.

New things, though excellent they may be, are naturally slow to make their roads in the industrial spheres. They have to displace old interests and routines, often prejudices. This hard task can only be accomplished through expensive and difficult mediums, otherwise the best thing dies in obscurity, like many other valuable discoveries having not the adequate power to draw the attention of a busy world. It is in the spirit of progress and in the interest of its readers that the TEXTILE COLORIST brings forth again the practical facts attached to this remarkable product.

In order to satisfy manufacturers interested in the test of chlorozone, we insert in the samples of practical dyeing department of this edition, a specimen of ramie bleached by this new agent. See recipe No. 12. Cotton samples in our next number.

On Mordants.*

BY P. PRUNIER, B. S.

(Continued from page 192.)

ALUM.

This name is to-day given to a whole series of double sulphates, but when the word alum is not accompanied by a qualification, that is to say, when this word is employed alone, without adding to it the name of the metallic base, which it may contain, it is, then, always sulphate of alumina and potash, which we wish to designate; of which we wish specially to speak in this article.

It is the most important of this series of salts and is the ground of a considerable commerce. The dyer and printer want it every day. It is also used for a multitude of works. It is by millions of pounds that this salt is yearly manufactured, beside the large quantity found around some volcanoes.

As alum is being manufactured on a grand scale in almost all manufacturing centres, and being found in all the druggists, even in the most unimportant towns, it is more economical for the consumer to buy than to manufacture it; we will not therefore treat particularly the fabrication of this product.

But as it is very important for the dyer and printer to have it as pure as possible in certain cases, and for special shades, we will say a few words with respect to it, and at the same time remain within the limit of this article, and give only that information which may interest the dyer and printer.

Commercial alum always contains more or less iron, which, although it should be present in greater quantity than we ordinarily find it, is not noxious in the making of blacks, or even of brown colors, since the iron forms the base of almost all the black and brown shades.

Hence, we will easily understand that an alum too much charged with iron, cannot possibly be employed for certain clear and lively colors, such as yellow, crimson, orange, green, etc., and in proportion to the absence of iron these shades will be pure and lively.

The table, which is subjoined, indicates the colors obtained with base of alumine as mordant, compares them with those with base of iron, and shows the importance which the dyer, printer, and manufacturer should attach to the choice of alum, and to its purification, in order to obtain pure shades in the series of the above named colors.

	COLORATION.	
	BY ALUMINA.	BY IRON.
Logwood	wine.	black.
Brazil wood	crimson red.	brown purple.
Hyperic "	" " "	" " "
Napan "	" " "	" " "
Barwood	dull red.	dark violet.
Cumwood	reddish.	" " "
Sanders	" " "	brown red.
Fustic	" " "	" " "
Quercitron	light yellow.	olive.
Perian berries	" " "	" " "
Fustic	" " "	" " "
Woad	" " "	" " "
Cochineal	crimson red.	purple black.
Madder	dull red.	brown black.

*Page 192 read Basille for Cassia.

We can easily detect if alum is or is not free from iron, by addition of a solution of yellow prussiate of potash, which causes a blue coloration, which shows that it contains iron in more or less quantity.

I will give processes to purify alum, either the commercial article or to manufacture a pure one, this in case some of our readers might have difficulty in buying any pure enough for particular use.

(To be continued.)

Verviers.

WOOLEN AND CLOTH DYES FOR MEN'S WEAR.

(P. PRUNIER.)

(Continued from page 192.)

PURPLE GREY.

100 lbs. wool. Boil 30 minutes the following in a water bath:
Tin crystals, . . . 3 lbs.
Tartar, . . . 5 "

After which add:

Cochineal, . . . 11 "

Boil again for 20 minutes. Add again, little by little, a solution of about a third of a pound of artificial indigo or of aniline blue-black.

PEARL GREY.

100 lbs. wool. Boil 30 minutes in a water bath:
Sulphate of alumina, . . . 4 lbs.
Saltzbourg vitriol, . . . 2 "

Add, little by little, a decoction of

Logwood, . . . 5 "

And afterwards:

Tin crystals, $\frac{1}{2}$ lbs. (say 7 ozs.)

DARK PLUM (PRUNE).

100 lbs. wool. Boil one hour in water:
Alum, . . . 5 lbs.
Tin crystals, . . . 21 "

After rinsing, dye with:

Logwood, . . . 30 "

BLACK-BLACK.

100 lbs. wool. Boil in water for two hours:
Saltzbourg vitriol, . . . 6 lbs.
Tartar, . . . 4 "

Dye with:

Logwood, . . . 40 "

Sumac, . . . 10 "

Fustic, . . . 4 "

BLACK.

This process admits of dyeing wool and cotton (mixed goods) in the same bath.

100 lbs. goods. Mordant at a temperature of only from 85° to 105° F., in the following bath for three hours:

Acetate of soda, . . . 6 lbs.

Saltzbourg vitriol, . . . 4 "

After a rest of a few hours, dye at a temperature of from 120° to 140° F. in a decoction of:

Logwood, . . . 40 lbs.
Fustic, . . . 5 "

After exhausting, draw off the bath, and add:

Bichromate of potash, $\frac{1}{2}$ lbs. (say 7 ozs.)

(To be continued.)

Process for Bleaching Textile Vegetable Fibres.

The method generally employed for bleaching textile fibres, and especially for linen yarns and cloth, consists in first dissolving away the glutinous matters and other impurities contained in the fibre by boiling with an alkaline lye, in order to prepare them for the treatment with chlorine which is to follow. In this latter process, the bleaching properly so-called, the fibres are submitted to the action of chlorine baths, concentrated at first, and then gradually becoming weaker, and alternating with sours of muriatic or sulphuric acid and with lyes of soda. The special object of the sours is to set at liberty the chlorine which remains in the fibres, and to neutralize the lime combined with the hypochlorous acid, whilst the alkaline lyes neutralize the acids in the tissues, and thus prevent their destructive action. During these operations the goods are washed with the largest possible quantity of water, and are then laid out on the grass in order to obtain a pure white by combining the action of light with that of the chemical reagents.

This process offers various inconveniences: it requires large quantities of water and of chemicals; heat is needed; the first outlay is heavy, as well as the cost of chemicals and fuel, and both much time and much labor are consumed. Moreover, the exposure on the grass, which is necessary for the production of a perfect white, cannot be carried on all the year, and the chlorine-baths have little efficacy in the winter.

In order to remove these defects, M. C. Beyrich, of Arnstorf, in Silesia, has devised a process which depends on the three following points: Hypochlorite of lime (chloride of lime), combined with oxalic acid or oxalate of potash, possesses bleaching properties decidedly more energetic than when alone, or than when in contact with other acids. Oxalic acid or oxalate of potash does not attack the fibres so strongly as the other acids previously employed in bleaching. In presence of oxalic acid, or of oxalates, the vegetable matters which in the ordinary process have to be removed before the bleaching can begin, do not interfere.

According to Beyrich, a part of the oxalic acid combines with the lime of the hypochlorite dissolved in the water, setting the hypochlorous acid at liberty, and the latter, by reason of its instability, is quickly decomposed into chlorine and oxygen, which in the nascent state has a very energetic action. This action is not interfered with by the foreign organic matters, which in the old process had to be first removed; another portion of the oxalic acid acts probably upon the fibres, and in virtue of its solvent power frees them from glutinous matters.

The application of this process is carried on under variable conditions, according to the nature of the cloth and to other circumstances. The general way of working is as follows: The cloth is treated for five or six hours in a bath of chloride of lime mixed

with oxalic acid; the length of the process depends on the nature of the goods. The lowest temperature of the bath is 64° – 68° F., and the highest 77° – 79° F. The goods are then rinsed with care, and treated with a weak solution of sulphuric acid; this operation may possibly be eventually suppressed. It is not advisable to add to the chlorine bath all the oxalic acid at once, and to plunge in the goods very rapidly, because the chlorine and the oxygen, liberated by the oxalic acid, act most energetically at the very moment of their disengagement. At the end of a certain time, the remnant of the oxalic acid is added. The weak sulphuric acid used after the chlorine bath, has not merely for its object to set free the hypochlorous acid absorbed by the tissue and to render it active, but also to transform into gypsum the lime embedded in the cloth, in the states of carbonate and hypochlorite; this gypsum does not injure either the whiteness or the lustre of the cloth. After being taken through the *sours*, the cloth is rinsed, then passed into an alkaline lye to neutralize any acid still clinging to the fibre, and then calendered.

These operations are repeated more or less frequently with weaker and weaker baths, according to the kind of goods under treatment, until a perfect white is obtained.

After the second lye, it is well to place the goods for some days on the grass; this preserves the texture and heightens the whiteness.

This exposure should only take place after the alkaline bath, or the effect produced will be contrary to what is intended. This process suits for all linen and hempen goods; raw cottons and very grey fibres should first be boiled with soda, but the bleaching then takes place very rapidly.—*Moniteur des Filés et Tissues*.

Dyeing and Scouring of Garments.

(Continued from page 189.)

Sulphur is used in both forms, either in vapor or in liquid; the first form is the cheapest, but must be used more carefully.

With the process by sulphurous vapor the articles are put into a box called *souffleur*, of a proportional size to the quantity of goods to be bleached; they must be put in the box while still wet, and arranged in such a manner as to allow the sulphurous vapor to go easily through the articles.

The sulphurous vapor is produced by the combustion of sulphur in such a part of the box, as to guarantee against risk of firing the goods, and with still more caution they are protected by some wire cloth close enough to allow the sulphur smoke, but not the flame, to come into contact with the articles. The sulphur, in burning forms, by combustion with the air, a gas, and discontinues to burn when it finds no more oxygen for its combustion. The sulphurous vapor formed, fills the box and reacts on the colors of the goods, the duration of this operation is usually from 4 to 6 hours.

By the bleaching in liquid, we use a solution in water, of the sulphite or of hyposulphite of soda added to some acid to liberate the sulphurous gas which is contained in those salts; but bleaching with sulphurous vapor is the most economical.

Some other compounds are supposed to have a bleaching power, but having experienced some of them, and not finding satisfactory results, we think they may not be sufficiently reliable to get a place in this article.

To be continued.)

Cyanogen and its Compounds.

BY PROF. J. F. KILBOM.

(Continued from page 191.)

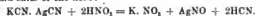
As we progress we come to cyanides known by certain prefixes, which, though not changing the substance determine its class. We have what is called metallic cyanide, and as one time is as good as another I will discuss this "prefixed cyanide" in this letter.

As the most of my readers are aware, cyanogen is a sort of monad radicle, forming, like Cl, Br, and I, a series of salts typified by the formulae $M'Cy$, $M''Cy$, $M'''Cy$, $M''''Cy$, $M''''''Cy$. Of these the most important is potassium cyanide, which can be formed by passing nitrogen over a mixture of red hot carbon and potassium carbonate:



This salt is also produced by heating potassium ferrocyanide either alone or mixed with potassium carbonate. Most of the metallic cyanides can be prepared by the action of hydrocyanic acid upon the oxides and hydroxides of the metals by double decomposition.

Again, the cyanides have a remarkable tendency to form double salts, such, for instance, as the double cyanide of potassium and silver, KCy , $AgCy$. Of these double cyanides a certain number are decomposed by the action of a mineral acid yielding free $H'Cy$ and salts of the acid:



Other double cyanides do not decompose in this manner by the action of the mineral acids; the heavy metal I have been unable to detect by the ordinary reagents, and no $H'Cy$ is evolved. Thus the double cyanide of potassium and iron, $4KCy$, $FeCy_4$, when acted upon by acids, exchanges its potassium for hydrogen, but the iron is not removed:



Potassium Ferrocyanide. Hydroferrocyanic Acid.

Thus the group $FeCy_6$ is generally regarded as an acid radicle, and a large number of its salts are known.

In order to make my theory more comprehensive, I will enumerate a few, which in the same manner we have, therefore, the following as the principal compounds:

Ferrocyanides,	$M'_2FeCy_6 = 6M'Cy$, Fe_6Cy_6
Cobaltocyanides,	$M'_2CoCy_6 = 4M'Cy$, Co_4Cy_6
Cobaltocyanides,	$M'_2Co_2Cy_6 = 6M'Cy$, Co_2Cy_6
Manganocyanides,	$M'_2MnCy_6 = 4M'Cy$, Mn_4Cy_6
Manganocyanides,	$M'_2Mn_2Cy_6 = 6M'Cy$, Mn_2Cy_6
Chromocyanides,	$M'_2CrCy_6 = 4M'Cy$, Cr_4Cy_6
Chromocyanides,	$M'_2Cr_2Cy_6 = 6M'Cy$, Cr_2Cy_6
Platinocyanides,	$M'_2PtCy_6 = 2M'Cy$, Pt_2Cy_6
Palladicyanides,	$M'_2PdCy_6 = 2M'Cy$, Pd_2Cy_6

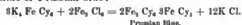
The most important of which of these compounds are the ferrocyanides and ferrocyanides of potassium.

Potassium ferrocyanides—known ordinarily as yellow prussiate of potash—is prepared on a large scale by fusing refuse animal matter, such as horn parings, leather scraps, &c., with crude potassium carbonate and iron filings. This salt is also formed when a ferrous salt is added to a solution of potassium cyanide:



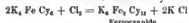
Potassium ferrocyanide crystallizes in large pale yellow crystals belonging to the quadric system, and having the expression

$K_4 Fe Cy_6 SOH_2$. Solutions of ferric salts produce in an aqueous solution of potassium ferrocyanides a deep blue precipitate of ferric ferrocyanide or Prussian blue:



Soluble ferrocyanides are thus a very delicate test for the presence of ferric salts, and conversely, ferric salts are used to detect ferrocyanides, and also cyanides by the simultaneous addition of a ferrous salt (Scheele's test for prussic acid).

Potassium ferrocyanide,—red prussiate of potash,—is prepared by passing chlorine into a solution of the ferrocyanide:



The ferrocyanide forms large prismatic crystals of a dark red color, soluble in water. Ferric salts give a brown coloration with ferrocyanides, while ferric salts give the blue precipitate of Turnbull's blue ($Fe_3 Cy_{12} + Ag$). The nitro-prussides are salts of the general formula $M_2' Fe' Cy_5 NO$ obtained by the action of nitric acid upon the ferro- and ferri-cyanides.

When I began this series, I thought but little need be said to cover the whole ground, but I find the subject as yet but fairly begun, hence will forbear further discussion until the next number. The science of chemistry illustrates many astonishing facts.

(To be continued.)

On Dyeing Anthracene Blue.

BY M. GUSTAVE DELORY.

Anthracene blue gives the following shades on cotton prepared with the following mordants:

Alumina, . . .	greyish violet.
Iron, . . .	dull blue.
Chrome, . . .	violet blue.
Tin, . . .	reddish violet.

The best fixing agent for anthracene blue, which in dyeing gives the most solid and the brightest shades, is the aceto-nitrate of chrome. Nevertheless, to obtain deep blues, the intervention of an iron mordant is necessary. On mordanting, for instance, in nitro-sulphate of iron or in black liquor at 3° R., and after fixing and washing, mordanting again in aceto-nitrate of chrome at 4° R., we obtain by dyeing with anthracene blue shades which may be compared to the heaviest indigo blues.

The aceto-nitrate of chrome, which is not mentioned in any manual of chemistry, is easily prepared by treating a mixture of bichromate of potash and nitric acid with a mixture of glycerine and acetic acid. It is also obtained by means of nitrate of chrome and acetate of potash.

Dyeing with anthracene blue requires particular precautions, and failure depends often on causes apparently very trifling. The effect of calcareous salts present in natural waters is always felt disadvantageously. Therefore waters charged with carbonate or sulphate of lime must always be perfectly corrected by suitable means.

The addition to the dye bath of a little soap and caustic soda remarkably assists the operation, though an excess of alkali is always injurious. The soap and the caustic lye (the latter at 10° R.) ought to be added in equal weights, and in such proportions that at

the temperature of 140° F. the color of the bath may be a blue, slightly inclining to a violet.

Anthracene blue in alkaline solutions begins to dye at 140° F., the temperature at which the goods ought to be entered. Brighter shades may, indeed, be obtained by entering at from 185° to 194° F., but there is then considerable risk of unevenness, a defect which it is difficult to avoid, even by adding the coloring matter in successive proportions.

The operation of dyeing may be prolonged with advantage to three hours duration, raising the temperature gradually in forty-five minutes from 140° F. to a boil. The latter temperature, it is true, if thus prolonged, deprives the shades of a little of their brightness, but in return it is very favorable to the fixation of the color.

The blue-violet obtained with the aceto-nitrate of chrome may be turned to a decided blue by a passage through an alkaline bath.

The shades dyed with anthracene blue resist atmospheric influences much better than indigo blues. Concentrated acids turn them to a reddish violet, and alkalies convert them to a greenish blue, but simply washing with water restores the primitive shade without apparent impoverishment. Chromic acid destroys them rapidly; nitric acid degrades them, leaving a characteristic greenish shade. The alkaline hypochlorites discharge them slowly, but if a mineral acid is added the action is as rapid as on indigo blues.

Blues fixed with aceto-nitrate of chrome upon cotton previously well oiled, and subsequently heated for two or three hours in a weak soap-lye at a pressure of three atmospheres in a closed boiler, are of a remarkable beauty and fastness.

One of the most remarkable peculiarities of anthracene blue, pointed out by M. Prud'homme, is that it is reduced in alkaline solutions, like indigo. By taking advantage of its sparing solubility in water, and of its tendency to form lime-lakes, we may contrive to set an anthracene blue vat, either with zinc and soda or with hydrosulphite of soda. The few experiments which I have made in this direction, following the indications of MM. Kœschlin and Prud'homme, are far from having given such favorable results as dyeing with mordants, and I do not believe that this process is likely to come into use in our dye-house.

The method just described, whilst giving very good results in point of the variety, beauty and solidity of the shades obtained, presents in practice, in addition to its great cost, practical difficulties which have caused me to lay it aside. Still, convinced that further researches will secure for this new coloring matter a brilliant future, I have considered that it would not be uninteresting to make known the novel facts which I have observed.—*Bulletin Soc. Indust. de Rouen*.

PSEUDOPURPURINE is a further oxidation product of purpurine, and occurs along with it in madder. It forms brick-red, needle-shaped crystals, which dissolve in alcohol with a red color. With ammonia it yields pseudopurpurine, and when heated it is decomposed, yielding purpurine. Another orange-colored substance met with in madder is regarded as a hydrate of purpurine. By the reduction of purpurine and pseudopurpurine we obtain yellow xanthopurpurine, which occurs in madder ready formed.—*Muster Zeitung*.

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Dr. M. FRANK, Manager.

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As all our agents and solicitors are furnished by us with written authority, we request our friends not to favor those having no credentials from us.

MR. JOHN H. MACDONALD is our sole representative for Great Britain and Ireland.

MR. MAX OMBER is our General Agent for the Eastern States (U. S.).

OUR ARTICLES on the subject of Technical Education, in the past year, have attracted the attention of our very able contemporary, the *Färber Zeitung*, who, after quoting our observations, says: "We desire to state here, that the above, with a slight modification, is what we have said six years ago of Textile Coloring Schools, and of the fundamental principles for such schools." We ask for no better advocate of the system than Dr. Reimann, for no man in Europe or elsewhere, knows better the necessity for such schools, and it is pleasing to see that his advice is being followed, and schools established. We see on all sides in Europe, a remarkable interest is taken in the instruction of pupils in the beautiful art of dyeing. In England there are already many schools in successful operation, and in Austria the good work has been well begun. France and Germany are never slow to give the rising generation a fair technical education. In fact all advanced nations wisely recognize the fact that to make a people truly independent, education—practical education must become the peculiar care of all nations wishing to attain to, and permanently hold a desirable position in the manufacturing world. Considering the necessity in a young country like ours for a thorough knowledge of textile art, accompanied by scientific acquirements, we feel that it is our duty to impress the necessity of this question of *Textile Education*, and more especially for those who resolve to pursue as a profession the beautiful art of dyeing. It is, in fact, the duty of the State to assist in the foundation and support of such schools by charter and endowment, on the simple principle that they who represent this people should act for the benefit of the people, and surely there is nothing that so advances their best interests as a pre-eminence in textile art and manufacture. We have what are called Polytechnic schools; but are they polytechnic? No, their's is a misnomer indeed. They are inundating the land with civil engineers who graduate to no purpose; mechanical engineers that are seldom mechanical, and the greater part of these seeing no prospect from their profession, sink into usefulness of less pretentious name, or proudly starve with bitterness upon their lips as they think of their time and money sacrificed to empty ambition. When will things be what they are called?

THE MODERN PROGRESS of the beautiful art of dyeing is something to be wondered at, as well as admired, when we consider in what a short time it has sprung up. For centuries the field was occupied by dye woods; and even in this enlightened day there are to be found dyers who persistently try to maintain their superiority to aniline color. But, it is not in the power of antiquated prejudice to impede the advance of a system of dyeing which has already proved its immense advantage over former practice, and had its merits acknowledged everywhere. And this is not all; for chemistry, with all its critical powers of investigation comes to its aid, and advocates its cause in a manner that leaves no doubt of still more astonishing developments of its intrinsic value to art. Yet there are still some people of little faith in the merits of aniline colors, notwithstanding; as there are, and always have been, men so stolid in judgment and obstinate in the maintaining of by-gone teaching that nothing which science could develop, or practical educe, could wring from them the relinquishment of their life-long favorite mode of dyeing. Such people are sure to be left in the back ground as a punishment for their pertinacity. And so obstinate are they that they will not even subscribe to or read any paper or book which might enlighten them in the least. It is a pity that men of experience, and in other things, of good judgment, should thus put their hands before their eyes, so to speak, and refuse to read, lest they might be convinced. But even in this there is a consolation, in as much as the obstinate unbelievers are very few, and in the natural course of events, even they will leave this progressive world, and be but little missed.

WE WILL SHORTLY COMMENCE the semi-monthly issue of a supplement, to be called THE DESIGNING AND WEAVING FASHION MONITOR. The necessary machinery is erected, and the best designers to be found in this country engaged, so that we will be able to present our own original designs instead of waiting for those of Europe. Our intention is to furnish from 8 to 12 drafts each issue, accompanied by full and explicit directions for weaving and finishing cassimeres, cloakings, coatings, overcoatings, dress goods, shawls, and fancy cotton goods.

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IT IS PLEASING to see how much more interest is taken now than formerly in the subject of dyeing in this country as well as in Europe. In Austria the dyers have had a conference; and in many places schools are established for instructions in dyeing, theoretically and practically. Here in America, as we have said, the interest has improved; but we still lack that enlivening spirit which a community of dyers would be sure to give rise to. We do not despair of that desideratum, however.

DYEING DEPARTMENT.

THE MONTH'S PRACTICAL RECIPES.

The following practical recipes, like all that will appear in this department, are verified as reliable and warranted to come out satisfactorily, provided the proportions are strictly adhered to, and the manipulations be workmanlike.

DIRECTIONS, NOTES AND COMMENTS.

NOTE—We have frequently been asked why we give the names of the makers of the aniline and dye stuffs we use when publishing the recipes accompanying our insets. The reason is: We can speak with authority for those we actually test; where, anilines and dyestuffs of the same color, manufactured by other firms, may be equally good, but when treated according to our recipe, may not give similar results. In giving the names of certain manufacturers, therefore we would not be thought partial to them. Each has his own mode of producing desired effects with his own dye stuffs.

Recipe No. 1.

SCARLET ON COTTON.

50 lbs. yarn.
Lay down over night in 18 lbs. Sumac, wring and enter.
2nd bath of Oxy-Muriate of Antimony 2° T, turn well, leave lay for 4 hour, wash in two waters, wring well and enter.
3rd bath of
12 ozs. Scarlet J. { Meister, Lucius & Bruening, Hoechst, A.-M.
Lutz & Movius, N. Y., Boston and Philada.
at 110° F., give 5 turns. Raise temperature to 130° F., and turn to shade.

Recipe No. 2.

CARMINE ON COTTON.

50 lbs. Yarn.
The manipulation is the same as No. 1, except use in the 3rd bath
14 ozs. Carmine Red. { Meister, Lucius & Bruening, Hoechst, A.-M.
Lutz & Movius, N. Y., Boston and Philada.
The Scarlet J. and Carmine Red are both new products of Messrs. Meister, Lucius & Bruening, and supply a great want to the Cotton Dyer. They are both excellent colors, easy to dye, and will give satisfaction. We advise dyers to test them.

Recipe No. 3.

LIGHT DRAB ON BRAID.

80 lbs. Braid.
Boll up 10 lbs. Glaubersalt.
5 lbs. Alum.
4 lb. Tartar.
4 Gallon Sulphuric Acid.
4 lb. Extract of Fustic, { Banning, Bissell & Co.
4 lb. Archil. { N. Y., Boston and Philadelphia.
4 oz. Indigo Paste.
Enter at 180° F., turn rapidly, bring to boil, and turn to shade.

Recipe No. 4.

ACID GREEN ON WORSTED.

30 lbs. Yarn.
Dissolve 5 lbs. Glaubersalt.
Add 4 lb. Oil of Vitriol.
2 ozs. Acid Green. { Badische Aniline and Soda Fabrik.
Pickhardt & Kuttroff.
4 oz. Picric Acid. { N. Y., Boston and Philadelphia.
Enter yarn at 170° F., turn lively and raise to boiling.
Note.—This Acid Green dissolves easily. For heavy, full shades it is economical. Picric Acid can be added to the liquor without injury to brightness.

Recipe No. 5.

OLIVE ON LOOSE WOOL OR SLUBBING.

120 lbs. Loose Wool.
Boil for 4 hour.
100 lbs. Fustic. {
3 lbs. Logwood. { Browning & Brother, Philadelphia.
Add 16 lbs. Madder.
Enter wool and boil for 1 hour, then sprinkle over wool 3 lbs. Coppersa well diluted, and after 20 minutes 3 lbs Blue Vitriol also well diluted, take out and air.
Note.—This color is fast for fulling.

Recipe No. 6.

FAST YELLOW ON SLUBBING.

50 lbs. Slubbing.
Dissolve 10 lbs. Glaubersalt.
Add 4 lb. Sulphuric Acid.
3 1/2 ozs. Aniline Yellow. { Badische Aniline and Soda Fabrik.
Pickhardt & Kuttroff.
N. Y., Boston and Philadelphia.
Clear the liquor before entering at 160° F., turn well and raise to boiling.
This shade dyes easily even, and is valuable on account of its fastness.

Recipe No. 7.

MOSS ON WORSTED. (ONE BATH.)

40 lbs. Yarn.
Boll 6 lbs. Glaubersalt.
1 lb. Alum.
4 lb. Tartar.
2 lbs. Sulphuric Acid.
2 1/2 ozs. Picric Acid.
3 ozs. Indigo Extract.
4 oz. Archil Carmine.
Enter at 180° F., turn well, raise temperature to boiling, and turn to shade.
This is one of the fashionable Spring shades.

Recipe No. 8.

RUBY ON SILK AND WOOL NOIL.

80 lbs. Yarn.
Scour the yarn, then turn for 4 hour in Marseilles Soap Liquor, at 150° F., wring and enter at 180° F.
Second bath of
12 ozs. Maroon S. { Badische Aniline and Soda Fabrik.
8 ozs. Orange A. { Pickhardt & Kuttroff.
4 lb. Indigo Carmine. { N. Y., Boston and Philadelphia.
Turn quick and bring to boil.
Note.—For the first lot it is advisable to give the dyestuffs in 3 parts, if not, it might be uneven.

Recipe No. 9.

SCARLET ON COTTON.

50 lbs. Yarn.
Dissolve in boiling water,
1 lb. 3 ozs. Bird's cotton Scarlet,
2 lbs. Bird's Special Scarlet Mordant, { Leeds Mfg. Co., N. Y.
Enter yarn at 110° to 120° F., turn continually to shade, wring well and dry at a temperature of about 70° F.
Note 1.—Dye in just sufficient liquor to work the goods easy.
Note 2.—As the mordant is a mixture of oil and other ingredients, care must be taken to shake well before using.
1 lb. dye is sufficient for succeeding lots of 50 lbs. yarn.

(Continued on page 11.)

TEXTILE COLORIST.—MONTHLY SAMPLES.

11

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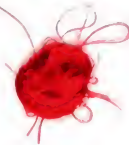
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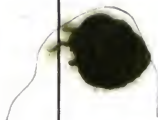
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PRICES CURRENT.

PHILADELPHIA, JANUARY, 1880.

DYES AND DYE-STUFFS.

	lb.	\$	6	4	8
Acetic Acid.....	40	65			
Albumen, Blood.....	40	65			
Albumen, Egg.....	40	65			
Alum, ground.....	21	02			
Alum, lump.....	21	02			
Aniline, prisms.....	30	40			
Aniline.....	1 30	1 50			
Aniline Oil, English.....	26	30			
Aniline Oil, French.....	26	30			
Aniline Salt, crystals.....	28	60			
Aniline Salt, cake.....	22	30			
Arnica Liquid, best.....	16	22			
Argols, crude Opfor.....	7	10			
Argols, crude Silly.....	7	20			
Argols, refined St. Ant. Brown.....	24	30			
Argols, refined, gray.....	20	73			
Argols, refined Light.....	29	32			
Aqua Ammonia.....	5	6			
Aqua Ammonia, F. F. F.....	5	8			
Barley.....	75	30			
Barley Root.....	5	6			
Barwood.....	2	2			
Bit-Chromate Potash.....	18	20			
Blanching Powder.....	3	2			
Borns, reduced.....	10	13			
Brazil Wood.....	3	6			
Blue Vitriol.....	8	10			
Brimstone, red.....	3	2			
Bumwood, pure.....	3	2			
Carmine.....	8	10			
Carbamide of Ammonia.....	20	21			
Castile Soda, 90 per cent.....	4	6			
Castile Soda, 70 per cent and over.....	4	4			
China Clay.....	24	60	25	00	
Chrysoidine.....	2	05			
Cochineal, Honduras.....	1	00			
Cochineal, Mexican.....	1	00			
Cochineal, Black Taweriff.....	1	00			
Copra.....	1	11			
Cream Tartar, crystals.....	35	38			
Cream Tartar, powdered.....	35	38			
Crimson Spirits.....	13	14			
Culmar, pure.....	18	35			
Culmar, No. 1, French.....	15	16			
Culmar, No. 2, French.....	23	25			
Cute.....	10	11			
Dip Dye.....	50	60	75	00	
Dyeing Acid.....	50	10			
Extract Fustic.....	19	24			
Extract Hyperic.....	19	24			
Extract Indigo.....	17	20			
Extract Logwood, bulk.....	9	9			
Extract Quercetin.....	9	9			
Fluxine.....	29	32			
Fustic, Cuba.....	14	21			
Fustic, Maracalla.....	14	21			
Fustic, Savilla.....	14	21			
Gambler, lules.....	5	7			
Gambler.....	1	2			
Green Ebony.....	4	6			
Hyperic.....	4	6			
Irish Moss.....	4	6			
Iron Nitrate.....	8	12			
Indigo, Auxiliary.....	10	12			
Indigo, Bengali.....	15	20			
Indigo, Caracoe, blue.....	80	87			
Indigo, Guatemala, blue.....	1 30				
Indigo, Madras, time.....	85	1 00			
Indigo, Manila.....	70	90			
Indigo, Bengali.....	18	22			
Indigo, Dye, dye powdered.....	10	15			
Indigo, Dye, good powdered.....	10	15			
Indigo, Wood.....	3	4			
Logwood, Camphrey.....	2	2			
Logwood, Honduras.....	2	2			
Logwood, Indigo.....	2	2			
Logwood, St. Domingo.....	10	11			
Madder, Dutch.....	10	12			
Madder, French.....	7	8			
Madder Dark.....	2	2			
Madder Dust.....	1 50	1 75			

	lb.	\$	5	6
Myrobolans.....	11	24		
Muriatic Acid.....	11	24		
Muriate Tin.....	84	91		
Muriate Tin, strong.....	19	22		
Muriate Tin, oxy.....	19	24		
Muriate Tin, crystals.....	21	24		
Nitwood.....	6	6		
Nitrate Iron, pure.....	6	6		
Nitrate Lead.....	1	8		
Nitric Acid.....	7	7		
Nutgalls, Aleppo.....	22	24		
Orchille.....	16	12		
Oxalic Acid.....	16	22		
Pearl Ashes.....	64	71		
Persian Berries.....	20	28		
Picric Acid.....	45	46		
Potash.....	26	31		
Prussiate Potash, yellow.....	65	70		
Prussiate Potash, red.....	11	2		
Quercetin.....	18	22		
Redwood.....	3	4		
Red Sanders.....	8	4		
Stannate of Soda.....	18	25		
Starch, Corn.....	4	6		
Starch, Potato.....	6	6		
Starch, Wheat.....	6	9		
Safflower.....	24	40		
Safflower extract.....	5 00	6 00		
Salt Ammoniac.....	12	13		
Salt Soda.....	1	2		
Sapanwood, ground.....	2	3		
Soluble Blue.....	83	87		
Sugar Lead, brown.....	18	25		
Sugar Lead, white.....	18	25		
Sumac, Silly, according to grade.....	75	00	00	
Sumac, Va.....	45	00	55	00
Soda Ash.....	1	2		
Sulphuric Acid.....	1	2		
Tartaric Acid.....	55	60		
Turkey Japan.....	4	5		
Turner.....	13	25		
Ultramarine.....	13	25		
Vergil.....	30	32		
Wool.....	10	12		

BUSINESS OPPORTUNITIES.

RARE OPPORTUNITY.—\$1500. will buy a long established and well known Dyeing and Sewing Establishment, with improved machinery, including Dyeing Works and Store, well fitted up, situated in Philadelphia. The present owner, if desired, will remain some time with the buyer to show the business. Address, or apply to Dr. M. Frank, Manager, TEXTILE COLORIST, 717 Sanson Street, Philadelphia, Pa.

SEE CASH, CAN BUY GOOD WILL AND FIXTURES of a well established Steam Dyeing and Sewing Establishment, in a city of 30,000 inhabitants, in central Pennsylvania. Address, or apply to A. K. care of Dr. M. Frank, Manager, TEXTILE COLORIST, 717 Sanson Street, Phila.

IMPORTANT TO DYERS! GREAT SAVING! We will supply Tannin Solutions of any required strength and color, quality guaranteed. Produced by a new process, from the best materials adapted to dyeing. Manufactured under the supervision of a skillful chemist. Correspondence invited. Address, Harrison Manufacturing Co., 313 Broadway, New York.

TO MANUFACTURERS.—Dyed and unbleached cotton goods are solicited by first-class French firms. Profitable relations can be established by addressing P. Premier, 123 Filbert Street, Philadelphia.

F. J. BIRCH, AUTHOR OF THE DYER'S HAND BOOK, is prepared to furnish reliable recipes in any branch of dyeing, and will have pleasure in matching to any color or shade for special customers, of his new Aniline Colors. See advertisement, page 6.

Address, 312 St. Marks Ave., Brooklyn, N. Y.

RECIPES FOR DYING and how to make Chemical Dyes, also, colors for Painters and Paper Stainers, can be obtained by addressing P. Premier, 123 Filbert Street, Philadelphia.

TO CAPITALISTS, DYERS, AND CHEMICAL MANUFACTURERS.—A first-class French Chemist would with the assistance of a capitalist to organize a company in this country, to make and sell a Tannin dye of new material, very abundant in this country, but not yet utilized—or would sell the process. For references and particulars apply or address P. P., care of H. K. Garner, Banker, 115 St. Fourth Street, Philadelphia.

TO REMOVE nitrate of soda stains from cotton, wool, etc., K&Z dissolves 10 parts of sal-ammoniac and the same weight of corrosive sublimate in 100 parts of distilled water, and moistens the spots. It must be remembered that this solution is very poisonous.—Chemiker Zeitung.

(Continued from page 10.)

Recipe No. 10.

BROWN ON COTTON. (NO MORDANT.)

50 lbs. Yarn.

Dissolve 1 lb. Bird's Dark Brown Aniline, (Leeds Mfg. Co., N. Y.)
Enter cotton about 150° F., turn to shade.

☐ It will dye from light to this full shade without mordant;
darker shades, nearly to black, are produced by the following method:
100 lbs. Yarn.

Dissolve 3 lbs. Bird's Pat. Aniline Mordant, (Leeds Mfg. Co., N. Y.)
2 lbs. Extract of Fustic.
1 lb. Alum.

Enter yarn at 130° F., give 3 to 4 turns, and lay the yarn in for
1 hour, wring and enter,
2d bath of 1 lb. Bird's Dark Brown Aniline, (Leeds Mfg. Co., N. Y.)
at 140° F., turn occasionally to shade.

Note.—By varying proportions any shade can be procured.

☐ This dye will take on cotton, wool or silk.

Recipe No. 11.

DARK BLUE ON COTTON.

50 lbs. Yarn.

Dissolve 1 lb. Bird's Pat. Aniline Mordant, (Leeds Mfg. Co., N. Y.)
1 lb. Extract of Fustic,
1 lb. Alum.

Enter yarn at 130° F., give 3 to 4 turns, and lay the yarn in for
1 hour, wring and enter,
2d bath of 10 ozs. Bird's Dark Blue, (Leeds Mfg. Co., N. Y.)
at 140° F., and turn to shade.

Note.—This dye is only intended for dark shades.

☐ We intend to publish several more shades of Bird's Special
Anilines for cotton, but for want of room are debarred.

Recipe No. 12.

BLEACHING OF RAMIE BY CHLOROZONE—THE NEW BLEACHING AGENT.

Chlorozone is a valuable bleaching agent, our experiments have
been limited, but with very satisfactory results. See article on
Chlorozone in this issue.

Recipe No. 13.

BLACK ON SILK. (WEIGHTED.)

This formula has been furnished to us by N. Spence Thomas,
Elmhurst, N. Y.

20 lbs. Silk Organsine, (boiled off.)

Enter silk in a cold bath of Nitrate of Iron, 12° B. for 1 hour,
wash and enter,

2d bath of 3½ lbs. Marseilles Soap,
1½ lbs. Soda,

boiling hot, turn for 1 hour, wash well and enter,
3d bath of 1½ lbs. Prussiate of Potash,

2 quarts Muratic Acid,

at 112° F., turn for 1 hour, until you get a good blue, wash and return
to Nitrate of Iron bath, turn for 1 hour, and wash, enter, boiling hot,
4th bath of 20 lbs. Spencer Thomas's Jet Black No. 44,

dissolved in just enough water, (no excess,) to properly work the
silk, turn for 1 hour, then wash and enter boiling hot,

5th bath of 10 lbs. Spencer Thomas's Strong Black No. 33,

10 lbs. Spencer Thomas's Improved Cutch,

dissolved in just enough water to work the silk, turn occasionally for
6 hours, wash well and dye with Logwood and Marseilles Soap in the
usual manner for black on silk.

Note 1.—Heavier weights may be given by duplicating the Iron,
Soap and Prussiate of Potash.

Note 2.—The liquors made with Thomas's No. 44, also Thomas's No.
33, and Cutch are to be saved for continuous use. Smaller quanti-
ties of the dyes, being added at each successive operation to
maintain liquors constantly at full strength.

☐ This makes a very fine black on silk.

Recipe No. 14.

SCARLET ON SILK.

20 lbs. silk Organsine.

Boil for 2 hours in 5 lbs. Marseilles Soap, stretch it well, and en-
ter dye bath at 120° F., containing from the old soap liquor enough
to produce a lather, add:

1 lb. Sulphuric Acid.

2½ ozs. Ponceau R. R. { Aetien Gesellschaft, Berlin.
Henry A. Gould, Boston, N. Y. and Phila.
dissolved previously and added at three different times, raise tem-
perature to boiling and turn to shade, wash and give it a weak diluted
bath of Sulphuric Acid, dry and finish as usual.

☐ Be careful to have your dye bath clean, by skimming top off
the same. For second lot you can enter silk at boiling temperature
and all the Aniline at once.

Recipe No. 15.

BENZYLE BLUE ON SILK.

20 lbs. Silk Organsine.

Manipulated the same as Recipe No. 14. Enter dye bath at 140°
F., containing:

1 lb. Acetic Acid.

3 ozs. Benzyle Blue R. { Aetien Gesellschaft, Berlin.
Henry A. Gould, Boston, N. Y. and Phila.
dissolved previously, and added at three different times, raise tem-
perature to boiling and turn to shade, wash and give it a weak diluted
bath of Acetic Acid, dry and finish as usual.

☐ This is one of the most fashionable shades for Spring and
Summer of 1880.

Recipe No. 16.

GREEN BRONZE ON WOOLLEN.

50 lbs. Yarn.

Dissolve 3 lbs. Alum.

Add 1 quart Sulphuric Acid.

1 lb. Induline, { Badische Aniline and Soda Fabrik.

1 lb. Aniline Yellow, { Pickhardt & Kuttroff, N. Y., Boston & Phila.

Enter yarn at 150° F., turn rapidly, raise temperature to boiling
heat, and boil to shade.

Recipe No. 17.

CARDINAL ON COTTON.

50 lbs. Yarn.

Lay down over night in short liquor of

12 lbs. Sumac.

Next morning take out, wring and enter cold in:

2d bath of Oxy-Muriate of Antimony, 2° T.,

turn occasionally during 1 hour. Take out, wash well, wring and
enter:

3d. Bath 7ozs. Cardinal Red { Fred Bayer & Co., Barmen & Elberfeld,
E. Sehlbach & Co., N. Y., Boston & Phila.

Enter at 120° F., turn rapidly, raise temperature to 140° and turn
to shade.

Note.—By the addition of a decoction of Turmeric, handsome shades
of scarlets can be produced.

ONE DIP FAST COLORS.

ON CARPET YARN WITH ANILINE COLORS.

Recipe No. 18.

LIGHT YELLOW ON CARPET YARN.

100 lbs. Yarn.

Dissolve 10 lbs. Alum.

1 lb. Acetic Acid.

4 ozs. Yellow Crystals No. 20 (F. Bredt & Co., N. Y. and Phila.).

Enter at 160° F., boil to shade.

Recipe No. 19.

GOLD ON CARPET YARN.

100 lbs. Yarn.

Dissolve 10 lbs. Alum.

1 lb. Acetic Acid.

1 lb. Yellow Crystals No. 20 (F. Bredt & Co., N. Y. and Phila.).

Enter at 160° F., boil to shade.

Recipe No. 20.

LIGHT BROWN ON CARPET YARN.

100 lbs. Yarn.

Dissolve 6 lbs. Alum.

 $\frac{1}{2}$ gallon Sulphuric Acid.1 lb. Orange No. 23, $\frac{1}{2}$ F. Bredt & Co., N. Y. and Phila.4 ozs. Induline No. 86, $\frac{1}{2}$ F. Bredt & Co., N. Y. and Phila.

Enter at 160° F., raise to boiling and boil to shade.

Recipe No. 21.

DARK BROWN ON CARPET YARN.

100 lbs. Yarn.

Dissolve 6 lbs. Alum.

 $\frac{1}{2}$ gallon Sulphuric Acid.1 lb. Orange No. 23, $\frac{1}{2}$ F. Bredt & Co., N. Y. and Phila.1 lb. Induline No. 86, $\frac{1}{2}$ F. Bredt & Co., N. Y. and Phila.

Enter at 160° F., raise to boiling and boil to shade.

☐ In changing the quantities of Orange and Induline, all shades from light yellow-brown to dark bluish-brown can be produced.

Recipe No. 22.

PINK ON CARPET YARN.

100 lbs. Yarn.

Dissolve 5 lbs. Alum.

10 lbs. Glaubersalts.

2 ozs. Orange No. 23, $\frac{1}{2}$ F. Bredt & Co., N. Y. and Phila.1 oz. Fuchsin No. 4, $\frac{1}{2}$ F. Bredt & Co., N. Y. and Phila.

Enter at 130° F., give three turns, raise slowly to boiling point and boil to shade.

Recipe No. 23.

CARDINAL ON CARPET YARN.

100 lbs. Yarn.

Dissolve 5 lbs. Alum.

10 lbs. Glaubersalts.

1 lb. Orange No. 23, $\frac{1}{2}$ F. Bredt & Co., N. Y. and Phila.12 ozs. Fuchsin No. 4, $\frac{1}{2}$ F. Bredt & Co., N. Y. and Phila.

Enter at 130° F., give three turns, raise slowly to boiling point and boil to shade.

☐ By the combination of Orange and Fuchsin and changing of quantities, shades from lightest Pink to the deepest Cardinal can be easily produced.

Recipe No. 24.

LIGHT FAST NAVY-BLUE ON CARPET YARN.

100 lbs. Yarn.

Dissolve 6 lbs. Alum.

 $\frac{1}{2}$ gallon Sulphuric Acid.

1 lb. Induline No. 86 (F. Bredt & Co., N. Y. and Phila.).

Enter at 160° F., raise to boiling and boil to shade.

Recipe No. 25.

DARK FAST NAVY-BLUE ON CARPET YARN.

100 lbs. Yarn.

Dissolve 6 lbs. Alum.

 $\frac{1}{2}$ gallon Sulphuric Acid.

2 lbs. Induline No. 86 (F. Bredt & Co., N. Y. and Phila.).

Enter at 160° F., raise to boiling and boil to shade.

Recipe No. 26.

LIGHT ORANGE ON CARPET YARN.

100 lbs. Yarn.

Dissolve 6 lbs. Alum.

 $\frac{1}{2}$ gallon Sulphuric Acid.

10 ozs. Orange No. 23 (F. Bredt & Co., N. Y. and Phila.).

Enter at 160° F., give three to four turns, raise temperature to boiling heat, and turn to shade.

Recipe No. 27.

DARK ORANGE ON CARPET YARN.

100 lbs. Yarn.

Dissolve 6 lbs. Alum.

 $\frac{1}{2}$ gallon Sulphuric Acid.

1 lb. Orange No. 23 (F. Bredt & Co., N. Y. and Phila.).

Enter at 160° F., give three to four turns, raise temperature to boiling heat, and turn to shade.

CHANGES will come with every New Year,—some for the better, some for the contrary. We see this verified in the appearance of a new popular science journal *The Practical American*, of which our able cotemporary, Dr. P. H. Vander Weyde, is both proprietor and editor. It is what was sorely wanted; a perfectly independent monthly, denouncing ignorance and imposition, and upholding genuine worth and honest modesty. At the same time that we hail the learned Doctor's appearance in an unfettered form, we feel a genuine regret for the loss of his veteran pen to the *Manufacturer and Builder*, a loss that we fear is not likely to be compensated for.

We have to apologize to our numerous friends and patrons for the delay in the appearance of the first number of the AMERICAN TEXTILE MANUFACTURER, owing to some annoying disappointments in the bringing to time of our contributory force. In the commencement of all campaigns there will occur an unlooked for failure of contingents; but, that overcome, the fight goes bravely on. If these expectations can be held in check until the latter part of this month, we promise to gratify all by a *bona fide* appearance.

"PUTEAUX BLUE" is a new color manufactured by the firm of Patry & Co., of Puteaux, in France. It seems more applicable upon silk than upon wool, for which latter fibre it is for the present too costly.

NOTES OF THE MONTH.

All communications under this head will meet with due attention, and deserving matters will be fairly treated.

MESSRS. PICKHART & KITTROFF, N. Y., have sent us a sample of Achi Violet, a new product of the Badische Aniline and Soda Fabrik. We expect to publish a sample next month.

MESSRS. LUTZ & MOVES, N. Y., have sent us a sample of Methyl Blue for Cotton, which we will sample next month.

We expect samples from A. Klipstein, N. Y., of Berlin Yellow and Saffranine A., two new products of Binschelder & Busch, Basel, Switzerland.

N. SPIEBER THOMAS, Elmira, N. Y., has favored us with his new circular, relating to the dyeing of black on Silk and Tussock Silk.

We have to acknowledge the receipt of sample patterns on worsted yarns of Bird's One Dip Dyes. They are worthy attention. Manufacturers and dyers can procure this sample book free, by addressing and enclosing their card to Leeds Manufacturing Co., N. Y.

We have received a communication dated Hoechst, A.-M., December 31st, 1879, informing us that the firm of Messrs. Meister, Lucius & Brueuning have transferred the Alizarine and Aniline Color Works conducted by them, to a Limited Company, under the style of *Färbwerke vorm: Meister, Lucius & Brueuning*. The partners of the old firm will continue to take a more or less active part.

We have received from Messrs. James L. Morgan & Co., N. Y., samples of their own manufacture of Laguna Logwood, Fustic Chips, Pure Ground Hyperic, Pure Ground Turmeric; also samples of their special importations and brands of Extract Indigo, Archil Liqueur, Picric Acid and pure Sicily Summe. We will test them at the earliest opportunity and report upon them.

QUERIES AND REPLIES.

Under this head we invite all our friends to make their inquiries on every subject connected with dyeing, etc., and we will endeavor to give them such information in answer as they are in need of. We also invite others to give us the aid of their experience in such replies. All will be welcome.

QUERIES.

42.—1. In the November number of the TEXTILE COLORIST, page 171, speaking of "Garment Dyeing," what is meant by "1 garment, 1 kilo?" And "1 hour, 80° R?" 2. What is to be understood by "litres of water?" 3. Is there not some instrument with which to test soda-ash and soap? G. R. Mc.

43.—What is the best method of dyeing a black with logwood and chrome, so as to secure softness, and at the same time leave the wool unweakened? I have for some years dyed various kinds of blacks on raw wool. For example: I dye a black with bottom of chrome, blue stone and alum, with vitriol. I have also dyed them with vitriol and chrome, and I have bottomed them with salt, vitriol, and chrome, and I have dyed them with argols and chrome. Now, I would like to have the opinion of some of your readers,—their different methods. I should like very much to see an article on blacks in your paper at your earliest convenience. Another idea—I have heard dyers condemning the washing of black on raw wool,

either out of chrome or logwood. They say it makes the wool cling and hardens it. Now, I do not very well understand how washing the black can harden the wool, although I have been following this plan more through prejudice than anything else. My recipes for the blacks I mention, are for the bottom: 330 lbs. clean wool; 7 lbs. chrome; 2 lbs. of blue vitriol; 2 lbs. alum; 1 pint vitriol, and dye, without washing out of chrome. 300 lbs. clean wool; 7 lbs. chrome; 8 lbs. salt; 6 gills of vitriol. Not washed either. 330 lbs. clean wool; 7 lbs. chrome; 4 lbs. argols. Wash out of this.

J. L.

[We hope some of our readers will answer these questions.—ED.]

44.—1. Please give me the address of the party from whom I can obtain the bleaching stuffs for Shappee and Tussock silks? 2. Can you give me any idea of the cost? PATERSON.

ANSWERS.

42.—1. A kilo is 2 lbs. and $\frac{1}{16}$ of a lb. The amount of garment to be dyed is therefore to be 2 $\frac{1}{16}$ lbs. in weight, and the bath to which it is to be submitted shall be of the temperature of 80° R., (meaning Reaumur.) 2. A litre of water is a French liquid measure, equal to 0.264 decimals of a gallon, or something over a quart.

44.—1. We have already given the name on page 63, in the article "On Silk." 2. To bleach it the cost would be 30 cents per pound for Tussock Silk, and fifteen cents for Shappee silk.

[We will undertake to procure the stuffs for our subscriber if he is willing to pay the cost.—ED.]

Dyeing of Silk in Skeins.

BY M. DE VINANT.

(Translated for the TEXTILE COLORIST by Prof. Marcel Van de Velde.)

ENGLISH BLACK.

1st Operation.—Make a good ground of yellow wool, adding a little sulphate of iron, dissolved separately, and drain off. After this operation envelop your silk in woolen or other cloth, and soak for one night: then wash and beat them.

2nd Operation.—Make a soap bath of 25 parts water, to which logwood is added. Dye to suit. Then wash and brighten with acetic acid or barberry.

LIGHT YELLOW.

The silk must not be washed, and you must dye upon a soaping, not too greasy with amato, for the red. Wash afterwards and brighten with sulphuric acid and heat. Add picric acid, needed to make the shade. Dry without washing. To darken this operation—instead of picric acid use turneric, but without acid. Wash and brighten with barberry.

Bath of annato:

1 kilo, pearl ashes,
1 " amato.

Boil for half an hour.

FONCEAU.

Boil for half an hour 5 kilos, of powdered cochineal. Drain, and bring the liquor to 30° B. Add to the bath three-quarters of a litre of solution of tin, and dye. 24 hours are needed to get the

color. After dyeing envelop your silk for 24 hours; then rinse lightly, and mordant with citric acid; then dry.

Some deep colors are loaded with gall before dyeing. Honey is used to load the lighter colors.

Solution of zinc for ponceau.

4 kilos. muriatic acid.
2 lit. nitric acid,
200 gr. granulated zinc.

Dissolve by degrees during one day.

MAROON.

1st Operation.—Pass the silks through a bath of catechu, weight for weight, of a 100 kils. of silk, if you want a good yield. But if you want the yield to be less, put less catechu.

Dye to a boil, take up, wring, and pass through a bath of chromate at 5 or 6 per cent., and at 77° F. heat. If the shade is very dark, force the heat a little, then wash well. Make up a dry-beck with fustic, extract of indigo and archil, add a little alum to make the wool draw, and sulphuric acid in small quantity for the blue. Dye to a boil and add blue, yellow or archil, to make it according to sample.

PONCEAU.

Prepare your silk in stannate of soda No. 1. Then pour in sulphuric acid and rinse very well.

Give then a second mordant of alumine No. 2 at 6°, thickened with 10 gr. of roasted starch, per lit. of alumine. Dry upon the mordant for at least 24 hours, then rinse, beat, dry with cochineal No. 3,—when you reach the shade. In the same bath add nitrate of zinc, to brighten the shade.

This process gives as beautiful ponceaus as with the preceding one, with less of the coloring matter.

My aim in thickening the mordant of alumine, is to facilitate the wetting of the silk; alumine having the quality to render tissues waterproof.

Many firms now-a-days make ponceau in giving to the silk a ground of annoto.

STANNATE OF SODA NO. 1.

7 kil. oxymuriate of zinc,
30 lit. caustic soda of the trade, at 22°, that you pour upon the oxymuriate in pieces and dissolve.

On the other hand you dissolve in 10 lit. of boiling water, 11 kil. oxalic acid, and afterwards add it to the above.

Use your mordant at 3° and cold. Rinse very well.

ACETATE OF ALUMINE NO. 1.

1 kil. of alum to be dissolved in 4 lits. of water.
On the other hand, 1 kil. of carbonate of soda to dissolve in 2 lits. of water.

Then pour by degrees your solution of soda upon your alum, and filter.

On the other hand you dissolve your paste as above, with 2 lit. of acetic acid pure, at 7° until complete neutralization of the alkali.

FUCHSINE.

Brighten the bath with tartaric acid, pour the coloring so-

lution and dye cold. Brighten after dyeing. To have a violet shade, make a ground with Hofmann violet or red violet, according to the shade desired, and finish the dyeing with fuchsine. One can even dye in a mixed bath of fuchsine and Hofmann violet, but this does not give as good results.

To have a shade nearer the yellow and approaching ponceau, dye the silk first yellow and pass it afterwards in a bath of fuchsine.

LYON BLUES.

Mordant the bath with sulphuric acid. Give five or six turns to the silk. Pour the coloring matter into the bath several times, according to the progress of the dyeing.

Begin to dye cold; bring the bath to ebullition. Brighten while boiling; soap, rinse and brighten lightly while cold, with sulphuric acid, to put it to dry.

SOLUBLE BLUES.

Same dyeing as for the preceding, but without soaping. The blues soluble in water are those best suited for dyeing fuchies, because the crases of the stuff are not noticed, as is the case with the blues soluble in alcohol.

ANILINE BLUE DYED WITH SOAP.

5 kil. soap,
Water.

Dye at 70° heat with

500 gr. sulphuric acid,
100 gr. dissolution of white soap.

Stir very well; add in four times:

50 gr. blue previously dissolved in water.

Dye afterwards, wash, brighten with sulphuric acid.

VIOLETS.

Brighten the bath very lightly with sulphuric acid and pass the silk in it.

Commence dyeing cold in making several "poncheous" (*Poncheou: refurnish the bath with dye*).

Raise the temperature until ebullition, to unite the shade,—the blue becomes darker with the ebullition. If the shade obtained is too blue, it is sufficient to keep the silk in the bath when colder.

Brighten once or several times with sulphuric acid, remembering that heat causes the red to drop.

With violet are made all the shades of white and grey.

VIOLET, HOFMANN, AND HOFMANN LIGHT.

Dyeing and mordanting, like with fuchsine.

GREEN, LIGHT.

100 gr. fuchsine, 1st quality,
200 gr. alcohol at 92°

in a balloon of a capacity of 3 lit.

After the dissolution add by degrees:

300 gr. sulphuric acid at 60°

Let it get cold. Then pour by degrees:

500 gr. lacteine.

After this put in a sand bath, heat a little, watch the reaction attentively, stop the operation when a drop taken in the balloon and

put in water acidulated with sulphuric acid, gives the color of indigo blue.

To separate the tar from the green coloring matter, pour the liquor, when warm, upon clean white sand, filter through calico, then exhaust the coloring matter adhering to the filter with boiling water.

Drain once or twice more, afterwards you evaporate the liquor in a closed vase to concentrate it until crystallization, if you desire.

Dye warm, with the addition of acid, and you obtain a very pretty green. If you desire a shade more yellow, add to your dyeing bath some picric acid. Rinse after dyeing. Brighten with lemon juice or tartaric acid.

This green is little used now-a-days, it is replaced by green light with iodide or the methyle green, these last products give brighter shades, and with less trouble. I have already given the recipe for this dye.

The Azoic Coloring Matters.

Among all the branches of chemistry, the industry of tinctorial matters is that which advances most rapidly and presents us most frequently with useful and interesting discoveries.

To follow all these evolutions and revolutions, is a difficult task which has overwhelmed many of those who have undertaken to lay this special literature before the consumer whom it interests.

After the discovery of Paris violets, of methylgreens, and of the resorcin colors, brighter coloring matters could scarcely be hoped for. Chemists in search of novelties had therefore to turn their inquiries in a new direction.

Fashion, moreover, threw itself with eagerness upon the shades of brown, maroon, garnet, olive, bronze, &c., which are obtained by combining red, yellow and blue. Hence the object became to find advantageous substitutes for turmeric, berries, fustic, orchil, &c.

The first great step in this direction was effected by the firm of Poirrier, and their scientific adviser, M. Ronsein, by the discovery and manufacture of those beautiful azoic bodies, known to dyers as orange, chrysoine, rocceline, etc.

The oranges is obtained by the reaction of the diazoic derivatives of sulphanic acid, and of sulpho-conjugated naphthylamine upon the phenols and the amines. These matters being at once red and yellow, and behaving like all the colors used in an acid flut, immediately took their place in practice and have been of great utility. Orange No. 1 serves instead of orchil and turmeric, and serves to produce, with extract of indigo upon wool and with the aniline blues upon silk, a great variety of brown and maroon shades. It is chiefly employed upon wool.

Orange No. 2 is the brightest and resists light best. It is in great demand for silks, where it serves to obtain many compound shades, maroons, browns, greys, salmon, as also mandarin and capucines. It is also used upon wool in many cases, especially to give yellowness to scarlets, and in compound shades where brightness is required. A certain number of dyers use Orange No. 2 successfully in cotton-dyeing in conjunction with eosine, and obtain magnificent scarlets and ponceaus. It is also of great value in dyeing leather, skins and feathers.

Orange No. 4, owing to its great tinctorial power, is an advan-

tageous substitute for turmeric, which is objectionable on account of its fugitive nature, but which has retained its footing in the dye-house by reason of its cheapness. Orange No. 4 is used on a large scale for heavy greens and olives.

Chrysoine is of a similar nature to Orange No. 4, but is preferred to it when a greenish reflection is preferred. All these orange-yellow colors are consumed day by day in large quantities, and have great advantages over the product sold under the name of chrysoiline.

Rocceline is the product obtained by the reaction of the diazoic derivative of sulpho-conjugated naphthylamine upon naphthol. This product gives shades very similar to orchil, but brighter, and is in comparison very economical. It is much used at present by silk dyers, who value it for its cheapness, its beauty and its fastness. Upon wool it renders it possible to obtain cheap garnets, for which magenta is unfit by reason of its instability. Rocceline is employed with great advantage as a substitute for orchil and eulbor for the red grounds of compound colors. If mixed with the oranges it gives a great number of red tones, such as cardinal, anaranth, etc.

French red is an intermediate product between rocceline and Orange No. 2, and it is used for cheap scarlets.—*Légende Textil.*

Ericine, a Color from Poplar Wood.

This new coloring matter, says the *Monteur de Fil et Tissue*, has received its name of ericine from *Erien vulgaris*, the botanical description of the common heath. It is prepared by heating with an alum solution the wood of (1st) the common heath; (2d) different kinds of poplar.

A liquor is obtained of a fine, clear yellow color, which becomes turbid on cooling, yielding a yellowish resin. The liquid separated from the resin by filtration oxidizes rapidly in contact with air and light, becoming at the end of a few days of a beautiful golden yellow, capable of competing with similar substances prepared in France by means of the weld (*wau*) of Avignon berries, or even with those manufactured in England.

The operation is conducted thus: The stems of the common heath, or the new branches and twigs of the poplar, cut, crushed and pulverized, are boiled with alum solution in the following proportions: For 10 lb. wood, 1 lb. alum, 3 gallons water.

The whole is boiled for 20 to 30 minutes, then filtered. The filtrate becomes turbid on cooling, and deposits a greenish-yellow resin abundantly. When the liquid is sufficiently free from the resin, it is filtered again and left for three or four days (sometimes five, according to the weather and season) exposed to the double influence of light and air. The liquor thus requires the golden yellow color, and is fit to be worked either into extract or precipitated as a yellow lake. The extract is obtained in the usual way, by evaporating the mother liquor down either to a sirupy consistence or to the dry state.

The ericine extract has all the qualities belonging to the yellow extracts ordinarily found in commerce, but it surpasses most of them in brightness.

It is easily recognizable, and only by the peculiar orange ap-

pearance it possesses, but especially by chemical analysis, giving a peculiar brown coloration with alkalies, particularly with ammonia; besides which the alum it contains can be easily detected by the well known reactions for alumina. Here are a few of the results obtained with this new product:

Greens.—In connection with indigo, Prussian blue, greens can be obtained on wool, silk, cotton, etc.

Carmois and noisette shades with oak rind.

Green or bronze with most of the iron salts, especially sulphates. **Wood shades** with nitrate of iron.

Orange in connection with red woods, as well as with cochineal, turmeric, etc.

Orange-yellow with ericine extract alone. The goods are mordanted first with acetate of lead or manganate of potassium, tartar, or any other basic salt, or, better still, with muriate of tin; then it is dyed in a boiling bath with the necessary quantity of ericine.

Light yellow, on wool, cotton, etc., by simply dipping in the dye bath prepared with the extract.

Fast golden yellow obtained as follows: The liquor, oxidized by exposure to air, is treated with muriate of tin; this precipitates the lake, which has only to be collected on a filter and dried. This solid yellow can be employed in paper staining, in the manufacture of artificial flowers, calico printing; in one word, in all industries where a yellow in the solid is applicable. Finally, it unites with Prussian blue or indigo to form greens, and with sandal wood to give oranges.—*Scientific American*.

Prize Questions.

The Industrial Society of Amiens offers a number of prizes for the solution of industrial difficulties. The manuscripts, models, &c., are to be sent post free to 29 Rue de Noyon, Amiens, so as to arrive not later than April 30th, 1880. Each memoir must bear a motto or cipher, which is also to be written on the outside of a sealed paper accompanying, in the inside of which are the name and address of the author. When the prize is adjudged to any manuscript, the accompanying paper will be opened to find the name of the author.

Question 32.—Gold medal for an important improvement in bleaching silk or wool.

Question 33.—Gold medal for the best treatise on bleaching hemp and jute, comprising a theoretic study and examination of the various methods now employed in industrial practice.

Question 34.—Gold medal for a means of increasing the fastness of artificial coloring matter.—*Chemical Review*.

"Ecarlate."

Among the new coloring matters derived from coal, there are few which have a better claim to our attention than "ecarlate." This product has already taken the place of cochineal in a considerable number of its uses, and the moment is not far distant when it may be said that cochineal has had its day.

We shall not enlarge here upon the composition of ecarlate, nor upon the manner of its manufacture.

We have to do merely with the manner of using this new pro-

duct, so as to obtain upon wool a beautiful scarlet equaling grain scarlets both in fastness and brightness. For 100 lbs. of wool add to the necessary quantity of water 2½ lbs. of sulphuric.

Dissolve in boiling water 1½ lbs. of the coloring matter.

Heat the water to about 86° F., enter the wool, and work it constantly whilst the water is raised slowly to a boil.

The dyeing is completed when the beck is exhausted, that is, when it holds no more coloring matter in solution, which is generally effected in about 25 to 30 minutes.—*Moniteur des Produits Chimiques*.

[This clearly endorses our remarks attached to Recipe No. 13, in our February number of last year.—Ed.]

On Coal-Tar Colors.

We find in the *Chemical Review* the following excellent excerpt, surveying the progress of coal-tar colors in the year just past:

The naphthalene colors are coming more and more into extensive use, and by their fastness against light and against soap they are displacing various other colors, especially the beautiful rosine dyes and cochineal.

Alizarine blue, from which such great things were expected, does not prove a success; a result due in part to its high price and in part to the difficulties attending its application.

The artificial synthesis of indigo has merely a scientific interest, as the prices of natural indigo run too low to permit of a successful attempt at the commercial production of the artificial kind.

Aniline black is still produced upon the fibre. The introduction of the cerium salts in place of the compounds of vanadic acid is technically a novelty.

The Schmid-Baldensperg process of producing aniline red from aniline oil, vanadate of ammonia, nitro-benzol and muriatic acid deserves mention.

The alizarine trade is in a better position than was the case twelve months ago, owing to the closing of certain establishments, and to improvements in the process.

The cheaper preparation of the chloride of methyl from beet-root treacle is of great importance, as also the improved preparation of benzo-trichloride, which now costs 5s. per 35 ozs., and serves for the manufacture of the new green.

Fischer's "bitter-almond oil green" is now made by the firm of F. Bayer & Co., of Elberfeld, as well as by Bindebecher & Busch, of Basel, and by the Baden Aniline and Soda Company. It is identical with malachite green.

The azo-dyes, which range from yellow to a dark bluish-red, and which afford a perfect substitute for cochineal, are rapidly growing in importance.

Two patents have been taken out for utilizing the arsenical residues from the manufacture of aniline colors. The process of Coupler is more and more displacing the use of arsenic acid.—*Chemiker Zeitung*.

ACCORDING to the *Chemiker-Zeitung*, it is intended to hold a general exhibition at Berlin in 1885.

Something Quite New.

BY F. J. BIRD.

(Continued from page 186.)

Aniline Blue on Cotton, no mordant. Aniline Violet on Cotton, no mordant. Aniline Brown on Cotton, no mordant. Aniline Scarlet on Cotton, no mordant.

While Edison has been indefatigable in his efforts in electricity, I may as justly claim to have been as untiring in my search after the above-mentioned colors. I suppose he has been successful in all but details. I have succeeded in detail and all, which is a recompense for all my anxiety and prolonged research.

These inventions are no modifications of former ones, as I have consulted no book or any individual upon them. They have both been studied and worked out in my own laboratory.

The scarlet is in every way as bright as cochineal on wool, and is dyed in a few minutes in one bath. The operation is simplicity itself, costing for full shade eight cents per pound.

Aniline Blue.—There is no dye, with the exception of eosine, that has given more trouble to fix easily on cotton than blue. I have never known one that would dye without a mordant, and stand washing without thereby losing its color.

Now, I claim not only to have accomplished this perfectly, but to be able to dye from the same aniline, not only a medium shade but all the way down from that to almost a black, by using my mordant for the darker shades only.

And I have still further developed it, so that any shade, from the red to a green, can be obtained, almost equalling a 4 B blue which will dye without mordant. Also, on cotton or mixed goods, and it may be considered *fast* so little will it rub. The green shade is more adapted to light shades, costing from two to three cents per pound to dye. From a dark to the darkest shade costs from four to six cents per pound to dye, including mordant, and will stand washing and equal indigo for depth of shade.

Brown on Cotton.—Some dyers have got on a great deal better with this color than others, as it is well known, by sad experience with many, that it was most difficult to dye rich dark colors in an easy and cheap way, as in some cases three or four separate liquors had to be used, involving a deal of time and trouble. Now, however, as far as I see, every want is well met in my browns, as from a drab to a full brown can be got from it by simply dissolving the dye and letting it be a short time; only in case of extra dark colors is mordant required.

Various shades are put up so as to meet the one required. They will be found fast, bright, strong colors, and will dye equally well on cotton and mixed goods. One pound will dye 1600 lbs. of drab or 100 lbs. dark brown, at a cost of 2½ cents per pound for the darkest shade of brown, so that every dyer who uses it is bound to admit that it is a perfect boon.

Violet.—Few find any trouble with this color who have found the proper mordant, as it is dyed both easy and cheap. All that I claim for this color, is that I have found a means of making a dye that will take most readily, evenly and brightly, from 4 up to 7 B shade, without any mordant. It will not wash out, and 1 lb. will dye from 20 to 30 lbs., according to shade, costing from 1½ to 2½ cents per lb. to dye. No shades are brighter than by this process. Specimens of these four colors are to be found in this month's TEXTILE COLORIST.

(To be continued.)

—We will pay SEVENTY-FIVE cents a copy for our first number, January, 1879.

Re-dyeing Colored Mixed Goods.

BY MAC.

Dyers, especially job dyers, at times experience great difficulty in getting a really good clean black on re-dye goods, caused in a measure by the alum and tin salts remaining in the fabric. No amount of cleaning will always clean the goods sufficiently to make a passably good black. The use of sumac and acetate or nitrate of iron for preparation of the cotton in the goods, is almost always certain to give a brown, sooty-looking black on either the wool or cotton (often on both.) In the first place, the goods are to be well secured with soap and sal-soda. Wash well, and, in a suitable vessel, give to 50 lbs. goods 12 to 14 ozs. bicarbonate, and 2 to 3 pints of aqua ammonia. Spring boil in this one hour; then wash well in a fresh bath. Boil up 13 to 15 lbs. of good logwood. Enter cool and bring up to spring boil for 30 minutes. Take out and cool well, then wring or drain well. Now to fill up the cotton: boil up well 10 to 12 lbs. logwood; work the goods a few minutes in this; must be cold. Allow to steep over night. Lift up and drain well. In the morning have another tub or suitable vessel. Fill up with cold water. Dissolve 1 lb. of copperas or proto-sulphate of iron. Work the goods in this for 15 to 20 minutes. Wash and return to the logwood tub, and wash 20 to 30 minutes, then wash well and finish.

By attending strictly to the method laid down, a really good and clean black can be always had; and, moreover, it will not crack or soil in any way in wearing, a result which cannot always be had by any other process when the goods have been previously dyed. Nor is there any probability of the wool or cotton, or both, turning brown if the bath is kept cold in filling up the cotton, and no danger of the goods becoming cloudy or uneven.

On Ostrich Feather Dyeing.

BY PAUL ALEX., PRACTICAL FEATHER DYER.

In last month's issue I gave to the readers of this Journal the process of washing and dyeing, mentioning at the time that I used only plain soap and water. Now a number of dyers in soaking and washing their feathers use *soda*. Let me say, the less *soda* used in washing, and the less copperas in dyeing, the better for the feathers. As a substitute for *soda*, use *elbow grease* and, for copperas, use, in dark colors, bicarbonate of potash. And, in all shades of drab and light colors, where a drabish cast is called for, use aniline; for, in my experience I have found there is no dye stuff the use of which is more injurious to feathers than copperas. Some dyers will say: "nonsense to think of excluding copperas from the dye-shop!" I have not used it for the past three years; and during that time I have made all colors, from the lightest grey to the darkest and richest shades of black without its aid. Soda seems to reduce the fibres to a pulp, softening the hardest fine, while copperas hardens and burns it. Some dyers have also an idea that passing their feathers through a solution of *soda*, before putting in bath, will aid in bringing out an even color—and they are right; it helps the dyer, and helps to spoil the feather.

In all my light colors I use hard warm water in preference to cold; it produces a more even color on the feather, and it will be also found that by putting in your starch when you begin to make, the color and rubbing it into the feathers, during the time the color is taking, it will produce a more even color than if you added it after, because it tends to keep the fibre wide open, and allows the color to spread even over the feathers. The dyer must understand that I am

speaking of light colors only; as it would not be a very wise proceeding to use starch in a dark color that requires a boiling bath. Touching on coloring, I would say—the first year I spent in a dye-shop was in company with an old Frenchman, one of the old-time dyers. I remember when he managed to turn out three or four colors in a day, he would feel and act as though he had done some wonderful feat. Poor old man, if he was working with me at present and could see me turn out from forty to fifty colors per day, he would no doubt, be astonished. I recollect one day, we were very busy, he undertook to show me how to make a dark shade of navy blue, a color that always took him almost a day to make, and then it was far from a good color when finished. I felt much honored when I started my first color according to his directions, thus: Small bath of two gallons of water, two lbs. chips logwood. Boil one hour. Take off and pour over feathers. Cover up and let remain for fifteen minutes. Take out and rinse. *Second bath:* One ounce of bi-chromate of potash, a gallon and half boiling water. Enter feathers, let remain ten minutes, stirring continually. So far so good. Here let me say that the foregoing is an excellent recipe for slate color, or *claire de lune*. But, to continue the navy blue: *Third Bath:* Quarter ounce marine blue, bluish, quarter ounce of marine blue, reddish, one ounce oxalic acid, one gallon boiling water. Enter feathers and let remain one hour, or until the bath is cold. *Result:* The feathers will come out all spotted all colors, green, purple, blue, yellow, and so forth. Any dyer must know what effect oxalic acid has on logwood and bi-chromate. While the acid was drawing off the logwood, it was putting on the blue. It generally took three hours to get so far, and the remainder of the day to patch up the spots. Nothing could give me more pleasure than to provide the reader with recipes for all colors; but, in justice to myself, I cannot at present, but hope to at some future day. Even from the few remarks I now make, a dyer will be enabled to glean much.

Let me add; should any dyer throughout the country wish to know the recipe for some color or colors, I will gladly furnish them.

(To be continued.)

The Theory of Colors.

APPLIED TO ART AND INDUSTRY.

(Translated from *Moniteur de la Teinture*, by C. R. Biquard, M. D.)

The *theory of colors* of Mr. W. de Bezold, Professor of Physics at the Polytechnic School, Munich, is a popular book, principally destined for artists and for all those that cultivate the mechanical arts. The American edition, which lies before us, has been revised and augmented by the author, and enriched with annotations by Mr. Pickering.

In the first chapters Mr. de Bezold recapitulates what is known of the causes of the phenomenon of the colors; in it, therefore, we find the explanation of the natural colors of the bodies, the laws of the mixture of colors, those of the contrast, simultaneous or successive, etc. Then the author makes application of these principles to the decorative arts and to painting. But, above all, in the last part of the volume are to be found new and interesting sketches. I shall not try to analyze the book, but would extract some remarks which have struck me while reading it.

It is now widely known that the mixture of the colored material is far from giving the same results as the mixture of colors, which

may be worked in different ways by the superposition of the images which the retina receives. And indeed, in this last case the produced sensation results from the sum of the luminous impressions separately promoted by each of the colors which are employed. In the case of the mixtures of the two colored matters, on the contrary, the final impression is the result of two successive absorptions or subtractions which the two pigments (coloring matters), have made the white light undergo. Thus, the gamboge-gum appears yellow, because it eliminates from the spectrum the blue and the violet, whilst the Prussian blue appears blue because it absorbs above all the red and the orange. It follows thence that a mixture of gamboge-gum and of Prussian blue will absorb the two extremities of the spectrum and leave intact but the medium part, so that the result will be a green tint. On the contrary, the direct superposition of the yellow and the blue gives the white (or at least a rather clear grey). It is thus that the white is obtained by the mixture of the following complementary colors.

Purple	Green.
Red	Green-blue.
Orange	Blue.
Yellow	Ultramarine.
Yellow-green	Violet.

I call here simply *blue*, the light blue that Mr. Helmholtz calls *cyanic blue*, and Mr. Bezold, *turquoise blue*; in like manner I call *ultramarine*; so does Mr. Bezold; the dark blue which the natural philosophers improperly designate under the name of indigo. Purple is the color which is obtained through the mixture of red and violet; it does not exist in the solar-spectrum; mixed with white it gives parts red.

The red, the complementary color of which is the greenish-blue, gives with the ultramarine blue, a dark rose; with the light blue, a whitish rose; with the green-blue, white; with the green, a whitish yellow; with the yellow-green, a golden yellow; and with the yellow, orange. Another whitish rose-color is obtained through the mixture of orange and ultramarine blue, or also from the yellow and the violet. But the resulting shade varies much, according to the proportion in which is mixed the two elementary colors. In some cases the mixture of colors gives the same result as the mixtures of corresponding colored matters, but generally, the result is different.

The results obtained with the mixtures of pigments, or with the transparent combinations of colored glasses or colored liquids, cannot therefore be taken as a basis of a rational theory. A curious experiment due to Mr. Strat, may serve to bring to light these principles. If we look upon a white surface through a yellow solution of bichromate of potassa, and a blue solution of litmus placed the one behind the other, the white surface appears not green, but yellow. And however the light thus searched through the two solutions, does not contain any yellow rays, the prismatic analysis shows that it includes only red and green, whilst in place of the yellow there is a large black band (or strip). It is the mixture of red and green which produces here a yellow tint. If we replace the dyeing of litmus by the sulphate of copper, the blue solution and the yellow

low solution will give together the green. Those examples show how difficult it is to force the effect which the mixture of two pigments will give, or to guess at first sight of what a natural color is composed.

It will also be understood now, why the Field's *chromatic equivalents* are of no value. According to Field, the colors which are used in ornamentation must be chosen and distributed in a manner that the ensemble seen from afar, are blended with a grey tint.

1. They wanted to justify this rule by saying that the predominance of a particular color has an effect to dull the sensibility of the retina for that color, and to provoke the sensation of the complementary color; if the red predominates, we are told, the eye will see the green, and all will seem false. But M. de Bezdol does not admit this reason.

The chromatic equivalents are deemed to indicate the proportions in which the usual colors must be employed, in order that the mixture gives a neutral grey. But Field has determined them with the assistance of colored solutions, and we have seen that this method cannot lead to the exact results. Effectively, the proportions advised by Field, give by no means grey when they are followed in the execution of a pattern (design). Let us add, that according to Mr. Bezdol, the principle even whence he starts is false, for the finest canvasses of the great painters, as well as the most admired ornaments do not show a grey tint when seen from afar; on the contrary, they present then a characteristic tint or *dominant color*. To cite only one example in support, the effects that certain modern painters have realized with their "symphonies in major blue," or their "yellow variations" are known.

The laws of the mixture of colors conduct immediately to the classification of colors. It is known that spectral colors are very far from exhausting the shades which are met with in nature, (the Romans had of them, it is said, 30,000 in their mosaics). But we can succeed in representing all the imaginable shades through mixtures, and by adding black or white.

It is known that Mr. Chevreul tried to put in order the chaos of the usual colors by the construction of his *chromatic circle*. You begin to distribute on a circumference the unmixed colors represented by seventy-two shades, derived from three principal colors, (red, yellow, blue), among which are placed first the orange, the green, and the violet, then the intermedial shades obtained through the mixture of the adjacent colors in diverse proportions. To each shade can now be given an infinity of *agreements*, either in clarifying it with white, or in abating (subduing) it with black. The mixture with the white weakens or lowers the tone. The mixture with the black darkens and raises it. Mr. Chevreul adapts for each shade a gamut of twenty tones, from the pure white to the black. He places in the center of the chromatic circle the white, and in the circumference the black; the successive tones are traced by twenty concentric circles, the tenth of which, beginning with the centre, carries the unmixed colors. The chromatic circle therefore comprehends seventy-two sectors, each divided into twenty chequers, which represent the twenty (tones) of a given shade that forms an ensemble of 1440 colors.

On Tannin.

BY MR. R. M. KURTZ.

[Translated by C. R. Squard, M. D.]

A chemical product which is at this very time in great request by the dyers as mordant for the threads and the cotton goods, silk, mixed with vegetable wool, etc., is the tannin, and that with reason, for whilst the dyer, who uses other matters containing tannin, as the sumac, the gall-nut, the myrobolans, the divi-divi, the avelanas, etc., (articles the price of which is extremely variable, according to the degree of maturity, the time of gathering, the mode of dessication, etc.), is obliged, before making use of them, to grind, to pound, to pulverize, to sift, to boil and filter them; the tannin, which is a constant product, and, in the preceding articles, the active agent, can immediately be dissolved in water. It is true that the tannin is rather costly (6 to 7 fr. the kil.), but much time, hand-labor and other accessory charges, are economized by its employment, and labor is performed to more advantage. One kil. of tannin represents the action of about 40 kil. of sumac; 18 kil. of myrobolans, 14 kil. divi-divi and 11 kil. galls; and besides, 5 to 7% coloring matter is economized. Add to which, that on the threads and the tissues with tannin, the color is much purer and has much more fire.

The tannin is prepared now for use in the arts almost exclusively, with what is called China and Japan galls; their sources are from sumac. These galls are at first perfectly dried, then put into a stamper, with a sieve, in powder as fine as possible; in the sieve this powder is agitated by strength of arm or by mechanical means. The powder is then sifted into cylindric vessels, more or less large, into three or four times its weight of a mixture of alcohol, as rectified as it possibly can be, and ether; in which it is agitated, and the extraction is systematically repeated four times.

The mixture of alcohol and ether is immediately received in a retort with double partitions, heated by steam, then the tannin which results thence is received in three or four times its volume of condensed warm water (completely free from iron), and left to settle for a whole day. Then a body,—green, resinous, insoluble in water,—detaches itself in a rather large quantity, coming to the surface of the tannic solution, which must be skimmed off. If the solution is not clear, it may be passed through a filter of charcoal. That done, it is evaporated in a boiler with double partition; heated in a water-bath until the water has been evaporated. As a solution of tannin, exposed to the air, and above all when it is warm, turns black forcibly, therefore the contact of that air must be avoided as much as possible, and we recommend for the copper-evaporating apparatus on a bench, forming a vacuum.

As soon as the water of dissolution has been expelled, the tannin (which is in a state of thick fluid) is poured into moulds of white iron, where it is left to be congealed in mass, then it is pulverized in mills similar to those used for indigo by means of bullets, finally it is sifted, while commerce generally expects that it should be in fine powder, so that it be quickly dissolved in the water.

The more ether applied for the extraction of galls as regards alcohol, the whiter the tannin is; the alcohol alone dissolves a rather strong proportion of coloring matter. The water, as first agent of extraction, is not admissible, because it dissolves a too large

quantity of that coloring matter and also other foreign substances, very difficult afterwards to separate from the solution. However, for many mechanical manufacturing applications, a tannin prepared with a strong concentrated alcohol alone, may serve as well as that prepared with alcoholic ether, which obstinately preserves an ethereal odor.

Many dyers combine the using of tannin with what they call the oily mordant or oleo-sulphate of ammonia, which gives to the color, particularly to the carmine, more fire, and permits, besides, economizing of the color. The preparation of this mordant is simple. In a large capsule, is poured, for example, 30 kil. of cotton-tree oil of a first quality, 15 kil. of sulphuric acid to 66° B. agitating it continually. The mass heats itself, disengages sulphurous acid, and is continued to be agitated until the whole has become quite homogeneous. When the mixture has cooled off, you pour in (continuing to stir it) sufficient liquid ammonia spread all over, in order that the liquid which results from it should have the odor and present a soapy, pulpy homogenous uniformity and a clear yellow. I shall not decide whether relatively to its effects this pulp is not of a too high price.—*Technologie*.

M. A. POTRIER produces upon silk an effect resembling that of oxidized silver by the following process: The goods are steeped in a solution of one part sugar of lead in five parts of water, and they are then spread out and air-dried. They are then hung in a chamber where sulphuretted hydrogen gas is generated, *e. y.*, by the action of muriatic acid upon sulphuret of antimony. If necessary these operations are repeated. By this means the silk is coated with sulphuret of lead. The process is applicable to all textile fibres, furs, feathers, etc. As sulphuretted hydrogen gas is very poisonous, and is liable to affect the eyes of the workmen, we should recommend the chamber in which the goods are exposed to its action to be connected by means of a pipe and a valve with the chimney of the works. Before the silks, etc., are taken out, the valve ought to be opened and the door set wide for some time before any person is allowed to enter, so that the remaining gas may be drawn up the chimney. It is, of course, not necessary that silk pieces, etc., should be entirely prepared with this solution: the sugar of lead may be printed on in any required design. Viallon proposes to apply this process in gilding and silvering silks. In the ordinary way of producing this effect much of the costly solution, say of gold, penetrates into the interior of the fibre, where it is, of course, wasted. Viallon, therefore, proposes to coat a silk first with sulphuret of lead by Potrier's process, and then to deposit the gold or silver upon it galvanically. The solution of the precious metals are thus prevented from penetrating deeply into the fibre. For gold this will doubtless answer, but metallic silver would, we fear, be blackened by prolonged contact with sulphuret of lead. Rossieur, on the contrary, proposes to coat the fibre with a very thin film of copper, upon which gold or silver may subsequently be deposited.—*Chemical Review*.

USE OF METALLIC SULPHURETS AS MORDANTS FOR THE ANILINE COLORS UPON COTTON.—M. Balanche, in order to mordant with sulphuret of zinc, steeps the cotton for a short time in a solution of 15 parts sulphate of zinc, in 100 parts of water, dries, and then steeps for two minutes in a solution of sulphuret of sodium at 15° B. In mordanting with sulphuret of tin, he steeps in a bath

made up with nine fluid ozs. preparing salt (stannate of soda) at 20° B., and nine fluid ozs. sulphuret of ammonium, and then takes it, still moist, through dilute sulphuric acid, at 2° B. In either case the mordanted goods are dyed in a hot solution of the aniline color in water.—*Moniteur Indust. et Chimier Zeitung*.

BEHAVIOUR OF HEMATOXYLINE ON DRY DISTILLATION. By R. Meyer.—In his first researches on galleine, Baeyer pointed out the great resemblance of this body to the coloring matters of logwood and the red woods, and considered it as scarcely doubtful that both belonged to the same family. In fact, the decompositions of hamatoxyline and brasiline prove that both belong to the class of the phenol-coloring matters. Brasiline, according to Kopp, yields resorcin on dry distillation, and is probably a succinine or iso-succinine of resorcin. Hamatoxyline (the coloring matter of logwood) yields on dry distillation a crystalline mixture of phenols, in which pyro-gallic acid occurs as galleine, and resorcin as fluoroscine.—*Berichte der Deutsch. Chem. Gesell.*

EXTRACTS FROM FOREIGN JOURNALS.

BLACK FOR PRINTING ON COTTON YARN.

Two Methods.

FIRST.

Boil up:

4 kilos logwood extract 6° B.
250 grams dextrine.
250 " wheat starch.

Stir until cold, and then add:

14 kilos pyrogallite of iron 25° B.

Stir thoroughly, and you can print at once with the mixture. The printed yarns are dried, hung up, and left drying for a day; then steamed, and, if necessary, rinsed.

SECOND.

Boil up:

4 kilos logwood extract 6° B.
500 grams gum tragacanth.
Stir until cold, and then add:
250 grams bichromate of potash.
130 " blue vitriol.

Stir thoroughly, and you can print immediately with it. The after manipulation is the same as for *first*.—*Reimann's Farber's Zeitung*.

FOR USEFUL WOOL.

[N. B.—The quantity of wool is always taken as 100 lbs., and that of the wares at so much per cent. on the goods.]

Dark Grey.

Boil for 1½ hour with—

3 per cent. nut-galls.
1 " sumac.
1 " logwood.
3 " copperas.

For lighter shades decrease the wares proportionately.

Silver Grey.

Boil for an hour with—

- 3 per cent. nut-galls.
- 1 " logwood.
- 4 " soluble iodine violet.
- 1 " copperas.

Olive.

- Boil for one hour with—
- 50 per cent. fustic.
 - 5 " bluestone.
 - 2 " argol.
 - 2 " sanders.
 - 1 " copperas.

Bright Olive.

Boil for an hour with the same wares, leaving out the sanders and adding extract of indigo (chemic) as may be required.

Deep Black.

- Boil for 1½ hour with—
- 34 per cent. bichromate.
 - 24 " sulphuric acid.
- Leave over night in the flat, and boil 1½ hour with—
- 40 per cent. logwood.
 - 8 " fustic.
 - 14 " bluestone.

Blue Black.

- Boil for 1½ hour with—
- 34 per cent. bichromate.
 - 2 " sulphuric acid.
- Let cool in the flat and dye with—
- 40 per cent. logwood.
 - 11 " bluestone.

Boiling for 1½ hour.

Bright Blue.

Boil for 1½ hour with the same proportions of bichromate and sulphuric acid as in the last, with the addition of 1 per cent. alum.

- Let cool in the flat and dye with—
- 25 per cent. logwood.
 - 4 " soluble violet, previously dissolved.

Sanders Brown.

- Boil for an hour with—
- 40 per cent. sanders.
 - 5 " logwood, a little magenta, and
 - 10 " fustic.

Add to the beek—

- ½ per cent. bluestone.
- 1 " copperas.

Boil for another hour and wash well.

The tone may be varied by adding more or less logwood or fustic.

Reddish Brown.

- Boil for an hour with—
- 3 per cent. bichromate.
 - 2 " sulphuric acid.
- Let cool in the flat, and enter the wool in a cold beek of—
- 30 per cent. of a red wood.
 - 5 " fustic.

4 per cent. magenta.

Boil for half an hour.

Another Reddish Brown.

- Boil—
- 20 per cent. catechu.
 - 30 " red wood.

Add 1 per cent. tin crystals, cool, enter the wool, and work for an hour. It may be browned by the addition of 4 per cent. bluestone.

Olive Brown.

- Boil for half an hour with—
- 14 per cent. bichromate.
 - ½ " argol.
 - ½ " sulphuric acid.
 - ½ " bluestone.

Rinse, or let cool, and dye in a beek with—

- 14 per cent. logwood.
- 60 " young fustic.
- 4 " orchil.
- 2 " calliatura.
- 7 " madder.

Deep Dull in on Woolen Pieces.

Make up a beek of—

- 6 per cent. alum.
- 14 " bichromate.
- 4 " tin crystals.
- 1 " sulphuric acid.

Work in this for half an hour, and either wash or leave in the beek. Then dye with—

- 50 per cent. logwood.
- 10 " calliatura.
- 2 " orchil.

Very Deep Violet on Woolen Pieces.

Make up beek with—

- 14 per cent. ebromate.
- 3 " alum.
- 4 " tin crystals.
- 4 " sulphuric acid.
- 1 " oxalic acid.

Work in this, rinse, or let cool in the flat, and then boil for an hour and a half with—

- 40 per cent. logwood.
- 12 " calliatura.
- 2 " orchil.

Reddish Mole Grey.

Boil—

- 4 per cent. calliatura.
- 4 " young fustic.
- 24 " sumac.

Cool, enter the wool, and work for an hour, at a boil. To sudden add the solution of—

- 4 per cent. copperas.
- ½ " argol.

And boil for twenty minutes. Alum may be used in place of the argol.

Another Reddish-Grey.

Proceed as above with—

- 2 per cent. callitaura.
- 4 " young fustic.
- 4 " sumac.

And sadden with $\frac{1}{2}$ per cent. of copperas.

Darker Reddish-Grey.

Boil—

- 7 per cent. madder.
- 5 " callitaura.
- 3 " young fustic.

Cool, enter the wool, work at a boil, and sadden with—
 $\frac{3}{8}$ per cent. copperas.

Light Green.

Work the wool in a hack off—

- 20 per cent. alum.
- 14 " argol.
- 10 " solution of tin.

And extract of indigo, more or less, according to shade.

Lift, and add a decoction of bark, enter the wool, and boil for three-quarters of an hour.

Fast Green for Furling.

Boil for an hour and a half with—

- 9 per cent. sulphate of alumina.
- 24 " bichromate.
- 24 " sulphuric acid.
- $\frac{1}{2}$ " tin crystals.

To finish, add—

- $\frac{1}{2}$ per cent. sulphate of alumina.
- 21 " extract of indigo.
- $\frac{1}{2}$ " French extract of fustic.
- $\frac{1}{2}$ " common salt.

And work the wool from one and a half to two hours.

Golden Olive.

Boil for 90 minutes with—

- 3 per cent. bichromate.
- 14 " bluestone.
- $\frac{1}{2}$ " sulphuric acid.

Boil for an hour and a quarter with—

- 61 per cent. dry French extract of fustic.
- $\frac{1}{2}$ " French extract of logwood.
- 3 " sanders.
- 3 " madder.

Sadden with—

$\frac{1}{2}$ per cent. copperas,
and boil again half an hour.

Blue-Black with Chrome.

Boil for an hour and a half with—

- 5 per cent. sulphate of alumina.
- 3 " bichromate.
- 14 " bluestone.
- 14 " sulphuric acid.

Dye with—

- 64 per cent. French extract of logwood.

After boiling for an hour, add—

- $\frac{1}{2}$ per cent. sulphate of alumina.
- $\frac{1}{2}$ " bluestone.

If the wool is not cooled when lifted, the shade goes on darkening.—*Teinturier Pratique.*

OUR TABLE.

We welcome the new year's faces of our old year friends; happy to see them refreshed and ready for the present, as they have proved themselves active in the past. As a stranger should have the first consideration, we will introduce to our readers:

The Practical American—an independent monthly, especially devoted to engineering, manufacturing and building. This most desirable journal is edited and conducted by Dr. P. H. Vander Weyde, for many years the very acceptable editor of the *Manufacturer and Builder*. The paper is good, the typography tasty, and the subject matter excellent. If any doubters suppose there was no room for this new-comer, we can assure them the learned doctor is just the man to make room for it, as this, his initial number, very clearly shows.

The Scientific American for January looks well for the new year. It is well supplied with matters of interest, not alone to scientists, but to all.

The Manufacturer and Builder.—The first issue for this year still bears the impress of its late editor, and is well filled with information, sound and diversified.

The Chemical News (London), for January, upholds its high character. Can we say more?

The Chemical Review (London), is, as usual, the well-informed friend of the dyer.

Le Teinturier Pratique.—This is really a most industrious expositor of all the information applicable to textile coloring.

Farber Zeitung and Muster Zeitung are both very welcome to Our Table as always conveying intelligence.

The Textile Manufacturer, of Manchester, England, is always acceptable.

The Scientific News (N. Y.).—Entering on its second year, our young friend has enlarged his forgo and increased his intelligence.

WANTS.

Manufacturers desiring help in any department, or persons seeking employment, can have their wants advertised in this column for the low rate of 25 cents per line. No other advertisement will be admitted in this department.

A FOREMAN DYER

In Old England.

ANXIOUS TO COME TO AMERICA.

WANTED.—A situation as Foreman Dyer of Calceons in all kinds of colors and shades to pattern—10 years practice in the most fancy and largest Black and Dye Works in Old England. Address, with terms, John Hilton, 22 Taylor Street, Tongs, near Aldgate, Lancashire, England.

WANTED.—situation by a competent Wool, Cotton Warp and Skein Dyer, Sizer, etc. Can give good reference. Address, L. L. 2, 419 Walnut Street, Room 24, Philadelphia, Pa.

TO RUSHBY MANUFACTURERS.—Wanted a position by a first-class dyer, lately from the midland counties of England, able to dye and finish merino, underwear, hose and half hose, in the piece in a very superior manner. (Can introduce something special in this particular business. Address, K., TEXTILE COLORIST office.

A PRACTICAL FANCY WOOL SKEIN DYER with years of experience, desires a position. Address, K. C., care of this paper.

WANTED A SITUATION by a competent, well-experienced dyer, who has worked for the firm of J. & H. Panton, the largest Woollen Manufacturers in Scotland of Barmreith and Fanny Tward (Globs) and for four years in the employ of Tines Salt, Ross & Co., Saltire, Yorkshire, England, and with other eminent firms, having served a seven years apprenticeship in the first dyeing establishment in Paisley, Scotland. Address, J. McK., care of TEXTILE COLORIST, 717 Sanson St., Philadelphia, Pa.

TEXTILE COLORIST.

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Philadelphia, February, 1880.

No. 14

Washing and Yarn-rinsing Machine

The long, tedious and expensive mode of washing and rinsing formerly in use everywhere, has, like everything in the industrial line, experienced a most desirable reform in the introduction of machinery well adapted to the washing of all kinds of yarns, silk, wool, cotton, etc. One of these machines we will here describe, as shown in the engraving, which is a reproduction from the engraving of the proprietors, made specially for the TEXTILE COLORIST, as was also the engraving below. This round machine consists of a water-tank. Its cop-spoofs projecting from the center, bear suspended the yarns to be washed. These spoofs turning on their respective axis keep the hanging yarns apart, and hang them uniformly in the water. The spoofs moving simultaneously to and fro, wash and rinse the yarn as though it were washed by hand. Thus the quantity of the water is economized. The machine here shown claims to have superiorities over others. It requires but two men to attend it, one to hang the yarns, and the other to remove it. The washing and rinsing is more perfect, because the yarn can stretch out, is loose upon the spoofs, therefore more uniformly washed than by hand washing, and where the part of the skein held by the hand is squeezed together, and consequently not washed equally with the rest. The spoofs being movable are easily regulated to suit the requirements of washing and quality of yarn. The supplying capacity of this machine is 8000 lbs. per day. The space required for setting it up is twenty-seven feet in

length by twelve feet in width. We will now call the attention of the reader to another machine, serving chiefly for washing woollen yarn before dyeing in soap-water, carbonate of soda, etc. C. G. Haubold, Jr., of Chemnitz, Sachsen, is the manufacturer, and Charles

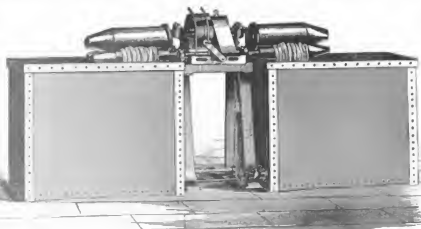
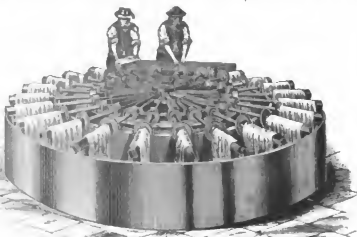
Regen the Agent for the United States. This washing machine consists of two quadrangular water tanks of wood or wrought iron, a strong iron trestle, and three metal rollers over each tank, with two lesser rollers placed together, and a larger one over those. The yarn is laid beneath the revolving rollers, the washing fluid passing over it, and it is then pressed or squeezed out from above by the loose rollers, without any injury whatever to the yarn. The yarn can be taken up or

down without stopping the machinery, so that it can work uninterruptedly the whole day. The capacity for supply amounts to from 2000 to 2500 lbs. per day, according to quality and state of yarn. One or two men are required for it. The space requisite will be 8

feet 9 inches by 3 feet 6 inches. The driving power is conveyed by belts requiring but little force.

APOLOGISTIC.—If there is one thing more than another which we loathe, it is the necessity for apologizing. In the present case, we are obliged to ask the indulgence of our patrons for being com-

pelled, on account of those delays incident to a first appearance, to apologize for the tardiness of the AMERICAN TEXTILE MANUFACTURER. It is, however, some satisfaction to us to know, and to be able to assure our friends that it will be put in a few days.



Silk Finish on Cotton Italian Cloths.

BY W. NANSON.

If we examine closely a piece of Italian cloth manufactured from wool or silk or combinations of the two, we shall find that it possesses a certain degree of elasticity, that it feels "fine"—not thick,—that the threads are round and out in bold relief, and that their lustre is uniform at all points in their circumference, and that the whole organization of the cloth is such as not to betray the slightest evidence of possessing any finish other than the natural characteristic lustre of the material from which it is manufactured; such is the *real* Italian cloth, and it is the close imitation of these effects, and means by which they may be effected upon cotton goods to which we would call the attention of the finisher. Now cotton possesses none of the necessary essentials within itself to produce the foregoing desiderata; therefore all the constituent principals indispensable to such imitation must be added mechanically, partly by the aid of properly constituted sizing mixtures, and partly through the agency of machinery suitably constructed to meet all the essential requirements of the case.

If we were to examine into and separate the elements forming the component parts of silk, wool and cotton, we should find that the three fibres differ materially from each other in their chemical composition, and it is this chemical difference which directly effects their lustre value, one hundred parts of wool for instance, would be found upon analysis to be composed of:

	Mineral matters,	—54
Fatty matters	{ Oxygen,	— 27.00
	{ Hydrogen,	
	{ Carbon,	
Pure wool	{ Oxygen,	— 72.00
	{ Hydrogen,	
	{ Carbon,	
	{ Nitrogen,	
	{ Sulphur,	
	Moisture,	6.06
		100.00

One hundred parts of silk would be:

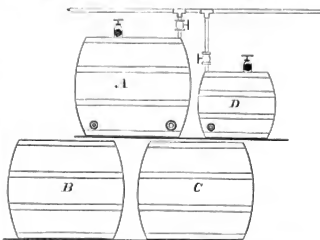
Fibres of silk,	{ Oxygen,	— 54.04
	{ Hydrogen,	
	{ Carbon,	
	{ Nitrogen,	
	{ Sulphur,	
Gelatin,	{ Oxygen,	— 19.08
	{ Hydrogen,	
	{ Carbon,	
	{ Nitrogen,	
	{ Sulphur,	
Albumen,	{ Oxygen,	— 25.47
	{ Hydrogen,	
	{ Carbon,	
	{ Sulphur,	
	Cerin,	1.11
	Fat and Resin,	0.30
		100.00

One hundred parts of cotton would be:

Cellulose,	{ Oxygen,	— 95.00
	{ Hydrogen,	
	{ Carbon,	
Mineral and extraneous matter,		2.00
		100.00

Now, it would seem from the above, that the natural lustre value of silk, wool and cotton is in direct ratio to the number of molecules of nitrogen found in the component parts of the fibre, and it may therefore be assumed that it is to the presence of these nitrogenous compounds in wool and silk that such lustre is largely due, and practical and exhaustive experiments have proved this hypothesis to be correct; wool, for instance, contains far less nitrogen than silk, while cotton in its turn contains none whatever, therefore the first objective point of the finisher is to supply the necessary nitrogen to the cotton by artificial means, and by so doing to render the threads capable of being converted into reflectors and not absorbers of light.

Now, at the commencement of this article, we showed that a lustrous finish is not the only desideratum, therefore the finisher must not only employ compounds, rich in nitrogen, as the basis of his sizing mixtures, but must so modify and constitute his size as to



fill the other requirements. In doing this he must observe the following essential points: first, that his size should possess no *permanent* stiffening power; second, that it should have no thickening value; and third, that it should be capable of taking a glossy lustre by the simple impact of the threads upon each other while passing through the chasing callender, and without exposing them to the flattening effect produced by the direct action of the smooth surface of the rolls.

There are a number of nitrogenous compounds, containing within themselves many of the necessary essentials for carrying out the foregoing requisites, the most suitable of which are albumen, casein and gelatin. The first of these is too expensive to be of any practical value; the second, though by far the most valuable as a sizing agent, possesses the inconvenience of being insoluble in water, while the third, though not possessing the marked qualifications which can be claimed for the other two, is by far the most practicable, being both soluble and economical. Moreover, gelatin may be prepared advantageously and economically at the dye-works by the finisher himself. The process is simple, and may be conducted as follows: [See cut above.]

The tub 'A' being nearly filled with *clean, fresh bones*, a quantity

(sufficient for their complete immersion) of dilute chlorhydric acid at about 8° T. is then added, and the temperature raised for a short time to about 100° F.; after remaining for three or four days in this liquor the bones become flexible, owing to the insoluble constituents of the bone being dissolved out by the acid; this flexible residue is *ossein*, while the resultant acid solution may be expressed thus:



This solution should be run into the tub C, and preserved for further use, as will be shown hereafter.

The *ossein* remaining in the tub A should now be drenched with water to remove all traces of acid; after effecting this, the tub should be filled up with water and boiled until the *ossein* is dissolved, or, in other words, until it is converted into gelatin. This boiling solution is then run into the tub B, where it will gelatinize upon cooling; it is then ready for use.

To obtain a silk finish with gelatin, it will be found necessary to modify its harsh, stiffening qualities by the admixture of some emollient; and the author has found that the best effects are produced by using a proportion of some neutral soap, regulating the quantity according to the finish required, but the finisher must use judgment and discrimination, and not lose sight of the fact that too much soap has a thickening effect, which would be undesirable, or that soap, unless carefully prepared, would be inapplicable to some colors. It is also advisable to use, in addition to the soap, something of a waxy nature, and in our experience Japan wax may be used to advantage to fill this requirement. It not only contains one of the constituent compounds of silk, viz: cerin, but, combined with the soap and gelatin, it will prove a powerful auxiliary to the polishing effect produced when the goods receive their subsequent calendering. The goods, after being sized according to the foregoing specifications, should then be dried, if possible, in a cool place, so as to avoid the shrinkage and contraction of the size, which always occurs when goods are dried on the hot cylinders, and which would seriously modify their required elasticity.

(To be continued.)

On Calico Printing.

BY DR. M. HASENCLEVER.

(Continued from page 2.)

ENGRAVING.

This important part was until late considered not strictly belonging to the art of calico printing, and was therefore carried out in outside establishments. But lately it has been generally combined with the print works. Instead of sending the designs and the rollers to the engraver, and getting the finished roller back, the engraving is now carried out in the works itself; this has greatly facilitated the working as to repairing damaged rollers, etc.

It depends very much upon the good workmanship in the engraving department whether a good design will be obtained on the cloth or not.

Before any attempt is made to put the design upon the roller for printing, it is necessary to prepare the roller itself; that is to

say, to give it the perfectly even and smooth surface which it requires, and also give it the accurate thickness. It depends of course on the size of the design, how many times it has to be engraved on the roller; large patterns often require only one engraving of the design, small ones require more, and the size of the roller has to be fitted therefore according to the size of the patterns.

After the roller has become a smooth and even surface, and the correct size, the engraving can commence.

There are three different ways to put the design on the roller. 1, by stamping; 2, by mills; 3, by etching.

The first way is only used by very small patterns where only one color shall be produced on the fabric. The stamp or dye consists of a small cylinder of hardened steel, on one end of which the pattern is brought out in relief. In obtaining a dye, the design is first engraved upon a piece of forged steel, which, when hardened, is called the "matrix." From this an impression in relief is obtained by means of a strong fly-press on softened steel, which also is hardened, and then called punch or die. A good working punch must be able to make many hundred impressions before it gets worn out.

This punch is placed into a machine with the pattern below, it is lifted up by a mechanical arrangement of the machine to a



certain height, and then falls down on the roller, thus making the impression. The machine is arranged in that way, that after lifting, the roller is turned so far round as the design requires. The manner in which the machine turns the roller, forms a serpentine line, thus allowing the whole machine to be left without watching, after it is once set, until the whole roller is finished.



The mill engraving also used for only small designs, is in some way similarly carried out as the above.

The pattern is cut upon a small cylinder of softened steel, which has been prepared previously, it must have received the exact size required by the design, the surface must be polished and perfectly smooth. When the design is cut on this cylinder it is hardened by heating it in crushed bones for several hours in a good drawing stove, and then by means of a pressing machine the pattern is pressed on another cylinder of softened steel, called the mill, in relief. The preparing of the mill must be done similarly to the die before it can be used. When the pattern is obtained in relief it generally becomes necessary to raise it, this is, to let the pattern come out more distinct, in order to produce a deeper impression upon the roller. The die and mill are for this purpose put back in the rolling press again, and the die partly brushed over with a thick varnish. The machine is put on to run for a few minutes back and forward, and when the mill is taken out, the raised places will be covered with varnish, while the deeper ones are left free. The mill so prepared is then dipped in nitric acid, which commences to eat up the steel on those places which are not protected by varnish,

These three differently constituted bodies, if correct, should yield by reduction the three different triamidobenzols. By reduction of the ordinary chrysoidine and by comparing the reaction of the so obtained triamidobenzol (1 : 2 : 4), it might be inferred that the position of the side chains would be best explained by the formula under No. 1.

Chrysoidine is prepared on a large scale by mixing a 1% solution of diazobenzol-nitrate with a 10% solution of phenylenediamine, which immediately produces a blood-red precipitate. This is then dissolved in boiling water, allowed to cool to about 50° C., and the base precipitated by ammonia. This is then crystallized from 30% alcohol, and then in boiling water, from which it crystallizes in pretty yellow needles, melting at 117.5° C. These are nearly insoluble in cold, but slightly soluble in boiling water, but very easily soluble in benzol, alcohol, ether, chloroform and aniline.

The chrysoidine is a pretty strong base, which however, only forms stable salts with one molecule of acids. These are readily soluble, undecomposed in water, with a fine yellow color.

By adding a large excess of acid, beautiful crimson-red salts are obtained, containing two molecules of acids, which cannot be obtained in a crystalline state. The salts containing only one acid radical, crystallize from their hot aqueous solution in two forms, which are often found alongside one another. By slow cooling of the solution, anthracite black octohedrons with strong vitreous lustre are formed.

(To be continued.)

Bichromate of Potassa as a Mordant.

FOR THE DYEING OF WOOLS.

It is known that the most of the coloring materials, certain aniline colors excepted, have or have not an affinity for wool; it is also known that, in order to fix the coloring principle, it is necessary to employ mordants which have at the same time much tendency to unite to the tinctorial substance.

The mordants not only fix the coloring principle on wool, but often determine its appearance, whence it results that with different mordants, very different colors can be obtained, although employing only one single coloring matter. The result is above all very remarkable in the use of logwood; it is also, with this tinctorial matter that the bichromate of potassa presents the most advantageous applications.

The object we must strive to attain in dyeing consists of: 1st. To lose nothing of the coloring principle. 2d. To fix it as solidly as possible, and give it as much brightness or brilliancy as we can.

In dyeing wools, it is likewise necessary in the tinctorial operations, to preserve their suppleness and their natural softness; both very important qualities, and above all in point of facility of fabrication.

The use of the bichromate of potassa leads to all these results, and presents besides the advantage of cheapness. This mordant effectively replaces those which are generally used. By employing this mordant, more brilliant colors are obtained, resisting the air and the alkalis better than those obtained by following the ordinary procedure. As the mordant has a very energetic affinity for

the wool and coloring principle, it fixes the last in a more complete manner.

Hence it follows that in order to obtain a similar effect, a less quantity of tinctorial matter is necessary.

Finally, this mordant presents the advantage of least alteration of the natural qualities of the wool, which dyed by its use becomes more practicable.

Independently of these general advantages, the employment of the bichromate likewise admits of imitating as perfectly in good dyes, the *greens*, the *olives*, the *buds*, as well as all the other colors where indigo enters as the element, that the most experienced judges can not distinguish these lesser tints from the good tints, without employing acids.

Dyed by this process, the wool loses nothing in the fulling, of the coloring principles which it has retained.

With logwood, shades are obtained which it would be impossible to obtain by any other means, except indigo itself.

The necessary quantity of mordant is fixed according to the quantity of the coloring principles which are required to be fixed; with a same bath of mordant all the colors are prepared. For that 20% is deducted for all the operations which follow the first; often the heightening bath is made use of prepare other wools.

The wool must be submitted to a light boiling during three-quarters of an hour in the heightening bath of coloring matter.

In lifting in wool on the hand-barrow and covering it, it gains doubly in intensity of color when it has been dyed by this process.

If absolutely required that the color be treated with indigo, one may in that process employ the logwood with the indigo; the color will be as beautiful and as fast in the air as the last tinctorial matter.

This mordant is likewise advantageous to obtain a green with the indigo without Campeachy-wood, by making use to fix the coloring principle of the fustic or of dyer's weed; the wool thus dyed yellow, then green, will discharge the tub blue less, and will be much softer than in the case where the yellow would have been fixed by alum. This mordant in effect suits better with the tub blue than any other; generally, it may be affirmed that for the most of the uses it excels in every point all the other mordants.

Preparation of the mordant to produce different colors:

The quantity of bichromate of potassa is varied in keeping an account of the five circumstances indicated further on; after reading these explanations, the quantity that is necessary to employ will be readily understood.

The maximum of bichromate of potassa which is suitable to use for 100 kil. of wool, is 2 kil. and a half, but this quantity is modified. 1. According to the quantity of coloring matter to be fixed, because the less one wishes to fix it on the wool, the less it needs mordant. 2. According to the fineness of the wool and the cloths, the difference of the wool and the cloths are taxed as much as 3%. 3. According to the more or less facility that the coloring matters have in uniting with the wool. 4. According to the brightness of the shades which one wishes to obtain, because the more the mordant is diminished the less brilliant is the color. 5. And lastly according to the capacity of the boiler in proportion of the wool to dye.

Notwithstanding these explanations, here is a basis for the different colors, according to which an infinity of shades can be dyed:

For 100 kil. of fine wool or 120 kil. of fine cloths:

Time of mordanting, 1½ hour.

Time of dyeing, ½ of an hour.

Colors.	MORDANTING.		DYEING.		
	Cubers.	Mordanting.	Campeschy Wood.	Yellow Wood.	Brazil Wood.
Black,		2 kil. 500 .	30 to 30 kil.	—	—
Slate,		1 " 750 .	18 22 "	—	—
Lead,		1 " 250 .	12 " 15 "	—	—
Grey,		0 " 750 .	3 " 6 "	—	—
Green, (invisible) .		2 " 500 .	— 26 " 4 kil.	—	—
Green, (sap) . . .		2 " 500 .	— 24 " 12 "	—	—
Green, (dragon) .		2 " 500 .	— 18 " 38 "	—	—
Green, (bottle) .		2 " 500 .	— 15 " 25 "	—	—
Green, (swallow) .		2 " 500 .	— 18 " 15 "	—	—
Green, (myrtle) .		2 " 500 .	— 8 " 70 "	8 kil	—
Olive, (dark green)		2 " 500 .	— 12 " 60 "	10 "	—

To the colors lead, slate, and grey can be given a yellowish shade with the yellow wood, and a reddish shade with the Brazil wood; the madder or the sanders, (the sanders is employed before mordant, but in the same bath, whilst the madder and the red wood, such as the Brazil, Lima and St. Martha, etc., are employed in the second bath).

In varying the proportions of Campeschy and yellow wood, an infinity of green shades can be obtained by that process. At a pinch the yellow wood can be replaced by the wood (dyer's weed); in that case it is necessary to substitute for 1 kil. of the tinctorial matter, 3 kil. of the second. The use of wood however is rather costly. For the greens, the common yellow woods are used, such as those of Jamaica, Tampico, Curacao, which have the advantage of giving a shade less orange than the wood of Cuba.

For the olives, madder or red woods (Brazil) is used in order to give the reddish tint of their shades.—*Monit. de la Teint.*

Sulphocyanides (Rhodanates) in Calico Printing as Reserves for Aniline Black.

Sulphocyanide of ammonia is present to a large extent in the ammonia liquors (gas waters) obtained as bye-product by the manufacture of coal gas. They may be obtained from these liquors in the following way, which is a plan recommended by Storck and Strobel: Muriatic acid is added to the gas waters till the latter reddened litmus paper; carbonic acid and sulphurous gases are evolved, while a yellowish precipitate is formed; to the clear liquor a solution of protochloride of copper (or the double salt resulting from the mixture of chloride of copper with bisulphite of soda) is added, when a grey precipitate falls down of sulphocyanide of copper, which contains all sulphocyanogen originally present in the solution. This precipitate is collected on a filter, washed, and then boiled with the necessary quantity of caustic barytes to decompose the copper salt, when it is filtered and the filtrate evaporated down till the sulphocyanide of barium crystallizes out on cooling. From this salt the

other sulphocyanides or rhodanates can be easily obtained by double decomposition with soluble sulphates of the metals whose sulphocyanides are desired, which will precipitate sulphate of barium and leave the required sulphocyanide in solution. The insoluble sulphocyanides of copper, lead, silver, mercury, are obtained by precipitating the solution with any soluble salt of these metals. The residue on the filter resulting from the boiling with caustic barytes can be used again for the preparation of chloride of copper. The ammonia liquors from which the sulphocyanides have been thus extracted can be worked in the usual way for the manufacture of ammonia and ammonia salts.

To show the use of rhodanates as reserves in printing, we may first say that if a current of anhydrous chlorous acid is passed through a solution of sulphocyanide it is soon absorbed, and a yellow precipitate is formed consisting of persulphocyanogen. On this reaction the authors rely in the employment of the sulphocyanides as reserves for aniline black. Roemstiel has proved that this black is formed by the oxidizing compounds like nascent oxygen, chlorine, and the chlorine-oxygen compounds containing less oxygen than chloric acid. The formation of the black may be watched by putting a piece of calico impregnated with muriate of aniline in a glass flask, and passing through this the gas evolved from chlorate of chromium, which is heated in another flask on the water bath. After a few minutes the calico, which was white at the beginning, becomes of a bronze color, then darker and darker, and finally deep black. So it is clear that if a substance is printed on calico which possesses the property of quickly absorbing the oxygen compounds of chlorine, without allowing them to react again on aniline salt, that the black is not formed on the places so reserved. For this purpose many substances have been recommended, such as caustic soda, hyposulphite of soda, etc., but none of them, it is said, answers so well as the sulphocyanides. A reserve which contains 4 lb. sulphocyanide of potassium or ammonium per gallon of gum water is enough to resist aniline black completely. As it is possible to use sulphocyanides in connection with all colors, so it will be possible by these means to print any color whatever under aniline black. When printing by ordinary recipes, either an albumen, tannic acid, or arsenic color, an addition of five to six parts of sulphocyanide of potassium for 100 parts of thickened color will be found sufficient. For acid colors the sulphocyanide of lead must be used. Alizarine red comes out best when, instead of acetate of alumina, the sulphocyanide of that base is used. Chromorange, catechu, fast red, etc., can be easily printed under aniline black by means of the above reserve.

For steam colors the whole of the operations are the following:

- 1st. Padding with Turkey Red oil (oleine).
- 2d. Printing of the steam colors.
- 3d. Steaming.
- 4th. Printing aniline black.
- 5th. Ageing.
- 6th. Through daubing (chalk) bath.
- 7th. Soaping and bleaching.

This process has been used with great success by the Prags-Schneower's print-works.—*Deutsche Industrie Zeitung.*

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Dr. M. FRANK, Manager.

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As all our agents and solicitors are furnished by us with written authority, we request our friends not to favor those having no credentials from us.

Mr. JOHN H. MACDONALD is our sole representative for Great Britain and Ireland.

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No SUBSCRIPTIONS RECEIVED FOR LESS THAN ONE YEAR.

IT IS SOMETHING to arouse the best energies of our friends in the textile dyeing industry to know that the progress of inquiry amongst our chemists, and the consequent discovery of products which enlarge the information of our dyers, and enable them to produce colors and shades which at sight engage the attention, and often the admiration of the most advanced experts.

Without the aid of chemical science this progress might have been slow indeed, and probably not developed in our age, if at all. And yet there are to be found those who will not yield their old style opinions, but stubbornly uphold the ignorant outcry against "book learning," because they are too indolent or too set in their way to take to anything new. Moreover the education of our textile artisans in days gone by was sadly neglected in regard to even the elements of chemistry. Therefore they have to follow in the wake of those whose superior knowledge places them in the advance.

The rising generation of dyers should take the lesson to heart, and seize every opportunity of promoting their own interest, as well as that of the beautiful art they are engaged in, by acquiring all the relative knowledge within their reach.

WORDS OF CHEER are inspiring to the laborer in mind or body, and arouse him even when tired and flagging, to still greater efforts than those which have already well nigh worn him out. Such being the enlivening influence of commendation on labor, how grateful must it be to us to hear from all quarters that the TEXTILE COLORIST is giving unqualified satisfaction. And this we hear from men of experience and thorough information in dyeing and bleaching, who gratefully acknowledge they have derived positive benefit from our pages. Some there are, who cannot see good in anything, and think it unnecessary to subscribe to a work which will not return them instant reward for their munificent effort of payment in advance for one year; never considering that in some one of the twelve issues they may (as has actually been the case,) discover a recipe or clue which may lead to a rich reward. One dyer informed us, that out of one number of last year's volume, he made

over four hundred dollars from the information derived from a single recipe. How many others obtained remunerative advantages we do not know, but we are sure that the profit of this little four dollar investment was by no means confined to that fortunate, if not sensible, individual.

HAVING noted in our exchanges a little couplet on the dyer, it has inspired our own epigrammatist, thus:

The dyer living, dyes for bread,
But dyes for aye when he is dead;
He oftentimes dreads the dire day,
When, colorless, he'll turn to clay.
And when he dies he says: at last
My peace (piece) is made, "the die is cast."

THE WELCOME TIME of flourishing industry is at last here, and every branch of trade partakes, more or less of its blessings. The dyer for his share, the dye merchant and manufacturer for theirs. Where one is benefited, the others are also. In the midst of this tide of prosperity, it would be well to take advantage of the improved position to endeavor to make it permanent, and this can only be done by creating an independent supply of coloring materials. By independent we mean to convey the idea of inventive resource, and that can best be attained by a union of practical minds. Why then cannot the dyers form a national association, like other arts and industries? The discussions of subjects of practical value to the whole community of dyers, as well as to all whose interests are connected with the beautiful art (and they are many), the raising of questions, and the making of pertinent suggestions. All that can possibly tend to advance the best interest of American dyers will, under such an influence, undoubtedly prosper, and gain that respect, abroad and at home, which it must be their desire to deserve.

IN ANSWER to numerous letters of inquiry which we are constantly in receipt of, we will here say that in consequence of being obliged to offer a premium for the earlier numbers to supply new subscribers, we find ourselves necessitated to charge \$10 for the first volume (1879). We also desire to say that the large number of orders for back numbers is being filled as rapidly as possible.

WARNING AGAINST TOBACCO JUICE.—It is a well known fact that tobacco juice contains nicotine acid, a sort of tannate, very refractory in dyeing. It has just been discovered in Europe that stains and imperfections, unaccounted for so far, on various goods submitted to careful dyeing were caused by the salivation of chewing workmen, especially weavers. Any moisture containing tobacco extract falling upon tissues of mixed materials such as wool and cotton, notably in raised goods, as velvet, plush, blankets, etc., will create spots deeper in shade than the ground color as if acted on by a stronger mordant. Manufacturers have been obliged to apply on an extra tannin mordant and re-dye many pieces of goods on account of this defect.


Strict regulations against this ill-use of tobacco salivation have been enacted in several establishments as a remedy for this curious inconvenience.

DYEING DEPARTMENT.

THE MONTH'S PRACTICAL RECIPES.

The following practical recipes, like all that will appear in this department, are verified as reliable and warranted to come out satisfactorily, provided the proportions are strictly adhered to, and the manipulation be workmanlike.

DIRECTIONS, NOTES AND COMMENTS.

 We have frequently been asked why we give the names of the makers of the aniline and dye stuffs we use when publishing the recipes accompanying our insets. The reason is: We can speak with authority for those we actually test; where, anilines and dyestuffs of the same color, manufactured by other firms, may be equally good, but when treated according to our recipe, may not give similar results. In giving the names of certain manufacturers, therefore we would not be thought partial to them. Each has his own mode of producing desired effects with his own dye stuffs.

Recipe No. 28.

PEARL ON SLUBBING.

50 lbs. Slubbing.


Boil 5 lbs. Alum,

1 lb. Sulphuric Acid,

2 ozs. Indigo Carmine,

3 ozs. Archil.

Enter slubbing at boiling point and turn to shade.

 This shade can be varied to any desired tone, is used for fancy dress goods, stands washing, but not fulling.

Recipe No. 29.

SALMON ON SLUBBING.

50 lbs. Slubbing.

Boil 5 lbs. Glaubersalts,

1 lb. Sulphuric Acid,

1 oz. Scarlet R. R. { Meister, Lucius & Bruening, Hoechst, A.-M.
 { Latz & Meyers, N. Y., Boston and Phila.

1 oz. Orange, { Actien Gesellschaft, Berlin,
 { Henry A. Gould, Boston, N. Y. and Phila.

Enter slubbing at boiling point, and turn very quick, as the evenness of color depends entirely upon good handling.

 This shade is fast and cheap.

Recipe No. 30.

LAVENDER ON SLUBBING.

50 lbs. Slubbing.

Boil 5 lbs. Glaubersalts,

1 lb. Alum,


1 lb. Tartar,

1 lb. Sulphuric Acid,

3 ozs. Indigo Carmine,

1/2 oz. Purple 3 B.

Enter slubbing at boiling point and turn to shade.

 This shade is used for fancy dress goods; will stand washing but not fulling.

Recipe No. 31.

DARK BRONZE ON WOOL.

50 lbs. Wool.

Boil 5 lbs. Alum,

1 lb. Red Tartar,

1 lb. Sulphuric Acid,

5 lbs. Extract Fustic,

6 lbs. Cudbear,

6 lbs. Indigo Paste.

Enter roving, turn rapidly, boil for 1 hour, and watch well that the stock does not mat.

Recipe No. 32.

CARDINAL ON COTTON FLANNEL.

50 lbs. Flannel.

Boil 10 lbs. Somac; enter flannel and leave lay over night; then wring and enter:

2d Bath, cold Oxy-muriate of Antimony 2° T.; give three or four turns and leave lay for 1 to 1 1/2 hour; wash out thoroughly in two or three waters, then enter:

3d Bath, 9 ozs. Cotton Red, 1751 (F. Bredt & Co., N.Y. & Phila.) at 80° F.; turn rapidly, and raise temperature to 120° F.

Recipe No. 33.

SCARLET ON COTTON FLANNEL.

50 lbs. Flannel.

Proceed the same way as for Recipe No. 32, but use in

3d Bath, 9 ozs. Cotton Red, 17 (F. Bredt & Co., N.Y. & Phila.).

Recipe No. 34.

PEACOCK BLUE ON WOOL.

30 lbs. Yarn.

Boil 1 oz. Borax,

4 ozs. Peacock Blue, { Badische Aniline and Soda Fabrik.
 { Wm. Pickhardt & Kuttroff, N. Y.,
 { Boston and Phila.

Enter at 160° F., turn to shade, while raising temperature to 200° F.

Note 1.—This shade may be given a more yellow tint by passing through a very weak bath of Sulphuric Acid, but the shade will lose some of its brightness.

Note 2.—Yellow shades can be produced by dyeing with a small quantity of Citric Acid instead of Borax.

Recipe No. 35.

PINK ON RAMIE.

30 lbs. Bleached Ramie.

Dissolve 3 lbs. Glaubersalts,

24 ozs. Erythrosine S. { Actien Gesellschaft, Berlin.
 { Henry A. Gould, Boston, N. Y.
 { and Phila.

Enter Ramie at 100° F.; turn to shade while raising temperature to 130° F., then wring and dry.

Note.—It is advisable to use the required aniline in two equal portions, one-half to begin, balance near finishing.

Recipe No. 36.

METHYL BLUE ON RAMIE.

30 lbs. Bleached Ramie.

Make a bath of Marseilles Soap liquor to make the bath feel soapy, add:

1/2 oz. Methyl Blue, No. 1, { Badish Aniline and Soda Fabrik.
 { Wm. Pickhardt & Kuttroff, N. Y.,
 { Boston and Phila.

Enter Ramie at 130° F.; give five to six turns, then add 1 lb. Sulphuric Acid; turn continually while raising temperature to 160° F.; wash out and enter second bath of a weak solution of Sulphuric Acid, then dry.

(Continued on page 37.)

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PRICES CURRENT.

PHILADELPHIA, FEBRUARY, 1880.

DYES AND DYE-STUFFS.

Acetic Acid.....	Per lb. \$	6 65	8
Albumen, Black.....	do	40	65
Albumen, Egg.....	do	80	95
Alum, ground.....	do	21	02 1/2
Alum, lump.....	do	21	25
Anatto, prime.....	do	30	40
Annatto.....	do	1 30	1 50
Aniline Oil, English.....	do	26	30
Aniline Oil, French.....	do	26	34
Aniline Salt, crystals.....	do	36	50
Aniline Salt, cake.....	do	22	30
Archil Liquid, best.....	do	16	22
Argols, crude Oporto.....	do	16	10
Argols, crude Selly.....	do	16	20
Argols, refined St. Ant. Brown.....	do	24	30
Argols, refined Gray.....	do	30	33
Argols, refined Light.....	do	32	32
Aqua Ammonia.....	do	54	64
Aqua Ammonia, F. F. F. F.....	do	6	8
Aurine.....	do	75	90
Barbury Root.....	do	5	54
Barwood.....	do	21	21
Bi-Chromate Potash.....	do	18	20
Bleaching Powder.....	do	10	3
Borax, refined.....	do	21	13
Brazil Wood.....	do	10	36
Blue Vitriol.....	do	6	10
Brimstone, roll.....	do	31	84
Canwood, pure.....	do	8	12
Canwood, No. 1.....	do	10	20
Carbonate of Ammonia.....	do	20	21
Caulic Soda, 60 per cent.....	do	4	54
Caulic Soda, 70 per cent and over.....	do	24	44
China Clay.....	do	25	00
Citric Acid.....	do	95	1 00
Cochineal, Honduras.....	do	85	90
Cochineal, Mexican.....	do	95	1 00
Cochineal, Black Teneriffe.....	do	95	1 00
Copperas.....	do	1	11
Cream Tartar, crystals.....	do	36	38
Cream Tartar, powdered.....	do	36	38
Crimson Spindle.....	do	13	14
Cudbear, pure.....	do	18	25
Cudbear, No. 1, French.....	do	23	25
Cutch.....	do	10	11
Dry Di.....	do	50	75 00
Dipping Acid.....	do	10	104
Extract Fustic.....	do	13	20
Extract Hyperic.....	do	19	24
Extract Indigo.....	do	12	32
Extract Logwood, bulk.....	do	9	94
Extract Quercitron.....	do	7	9
Flavine.....	do	29	32
Fustic, Cuba.....	do	1	24
Fustic, Maracibo.....	do	18	2
Fustic, Savilla.....	do	18	2
Gambler, bales.....	do	5	7
Gambler, small.....	do	11	2
Green Ebony.....	do	4	4
Hyperic.....	do	34	4
Irish Moss.....	do	44	5
Iro Nitrate.....	do	10	12
Indigo, Auxiliary.....	do	10	12
Indigo, Bengala.....	do	1 75	2 60
Indigo, Camocasa, fine.....	do	80	87
Indigo, Guatemala, fine.....	do	1 30	1 00
Indigo, Madras, fine.....	do	85	1 00
Indigo, Manila.....	do	70	90
Lac Dye, fine powdered.....	do	18	22
Lac Dye, good powdered.....	do	10	16
Lima Wood.....	do	31	41
Logwood, Campeachy.....	do	18	2
Logwood, Honduras.....	do	2	21
Logwood, Logonia.....	do	24	21
Logwood, St. Domingo.....	do	11	11
Madder, Dutch.....	do	10	12
Madder, French.....	do	7	84
Maple Bark.....	do	2	21
Marble Dust.....	do	1 50	1 75

Myrabolans.....	Per lb. \$	5	6
Muriatic Acid.....	do	13	21
Muriatic Tin.....	do	84	94
Muriatic Tin, strong.....	do	19	22
Muriatic Tin, weak.....	do	19	24
Muriatic Tin, crystals.....	do	21	24
Necwood.....	do	21	3
Nitrate Iron, pure.....	do	6	8
Nitrate Lead.....	do	11	12 1/2
Nitric Acid.....	do	7	7 1/2
Nutgals, Aleppo.....	do	22	24
Orehille.....	do	16	22
Oxalic Acid.....	do	19	22
Pearl Ashes.....	do	64	7 1/2
Persian Berries.....	do	20	26
Pieric Acid.....	do	45	46
Potashes.....	do	5	54
Prussiate Potash, yellow.....	do	26	31
Prussiate Potash, red.....	do	65	70
Quercitron.....	do	11	2
Redwood.....	do	2	4
Red Sanders.....	do	18	25
Stannate of Soda.....	do	18	25
Starch, Corn.....	do	4	6
Starch, Potatoes.....	do	6	64
Starch, Wheat.....	do	6	6
Safflower.....	do	24	44 1/2
Safflower extract.....	do	5 00	6 00
Salt Ammoniac.....	do	12	13
Salt Soda.....	do	11	12
Sapanwood, ground.....	do	24	3
Soluble Blue.....	do	85	87
Sugar Lead, brown.....	do	94	10
Sugar Lead, white.....	do	94	10
Sunace, Selly, according to grade.....	do	75 00	90 00
Sunac, Vm.....	do	45 00	55 00
Soda Ash.....	do	2	24
Sulphuric Acid.....	do	18	21
Tartaric Acid.....	do	55	60
Term Japonic.....	do	41	54
Turmeric.....	do	7	grd. 8
Ultramarine.....	do	18	35
Verdigris.....	do	30	32
Wend.....	do	10	12

BUSINESS OPPORTUNITIES.

RARE OPPORTUNITY.—Aston, will buy a long established and well known Dyeing and Scouring Establishment, with improved machinery, including Dyeing Works and stores, well fitted up; situated in Philadelphia. The present owner, if desired, will remain some time with the buyer to show the business. Address, or apply to Dr. M. Frank, Manager TEXTILE COLORIST, 717 Sanson Street, Philadelphia, Pa.

F. J. BIRD, AUTHOR OF THE DYER'S HAND BOOK, is prepared to furnish reliable recipes in any branch of Dyeing, and will have pleasure in matching in any color or shade for special customers, of his new Aniline Color. See advertisement, page 2.

Address, 217 N. 2nd Ave., Brooklyn, N. Y.

RECIPES FOR DYEING. Whiting, Silk Process, Chemical Dyes; also, colors for Painters and Paper Stainers, can be obtained by addressing P. Prunier, 123 Fifth Street, Philadelphia.

TO CAPITALISTS, DYERS, AND CHEMICAL MANUFACTURERS.—A first-class French Chemist wants with the assistance of a Capitalist to organize a company for the manufacture of a Black Dye; also a Tonic from raw material very abundant in this country, but not yet utilized—or would sell the process. For references and particulars apply or address P. P., care of H. K. Garrod, Banker, 111 B. Fourth Street, Philadelphia.

Process to Prevent Greening on Black Aniline.

The action of the air, of the light, of phosphate of soda, as well as of many other oxidizing agents, produces a green cast on black aniline. To prevent this deteriorative effect, Mr. Dryfus of Manchester has found the following method. He submits the yarns and tissues to a weak solution of bi-chromate, and dries them. Then he applies the colors, to which he adds some muriate of aniline, or other salts of aniline or toluidine, together with a certain quantity of salt of bromine. After printing or dyeing, the goods are passed through a bath of carbonate of soda, and after that washed in a weak sulphuric acid bath. Finally they are washed and then passed through chloride of calcium or common salt. They are then ready for the usual scouring.—*Moniteur des Produits Chimiques.*

2nd Bath at 100° F.,

2 lbs. Yellow Prussiate of Potash,
2 lbs Sulphuric Acid.

Give six turns, wring, and repeat through 1st and 2nd bath without any addition

3rd Bath luke warm,

2 lbs. Fustic,
½ lb. Logwood,

Give six turns and wring.

[C] In third bath need not exceed 110° F., as the Prussiate bottom will lose its brightness and a poor color will be the result.

Recipe No. 47.

OLD GOLD ON COTTON.

100 lbs. Yarn,

Boll ½ lb. Flavine,

Dissolve 2 lbs. Alnm.

Enter cotton at 160° F., give 8 turns, hang up, add

1 os. Bismarck Brown, } Meister, Lucius & Brueening, Hoechst, A.M.
½ lb. Hyperic, } Latz & Movius, N. Y., Boston and Phila.
Turn to shade, wring and dry.

NOTES OF THE MONTH.

All communications under this head will meet with due attention, and coloring matters will be fairly tested.

On account of the large numbers of samples which we produce monthly, (exceeding the amount of 12, which we originally promised to our readers), we are not able to give every manufacturer of Anilines room in our practical department. We daily receive information of new products of Reds, Yellows, Blues, Greens, etc., but find them nearly all alike, some having a new name, or a new number; consequently recipes are very often repeated. This system in fact is quite confusing to us, as well as to the consumer. Nevertheless we find it an advantage to our foreign readers to mention the manufacturers name and the representatives in this country. As there is quite a difference in strength between the products, we would prefer leaving it to our readers to draw comparison for themselves.

FROM THE BOSTON DYEWOOD AND CHEMICAL CO., Boston, we have received samples of anilines: Fast Yellow N., Saffranine V. E., and Cotton Orange No. 1, which we will test and produce samples of in our practical department. Also from the same firm, samples of solid extracts of Logwood, Fustic and Bark, also samples of Henatein, Logwood, Fustic and Bark Liqueur, all 51%, which we will examine and report upon at some future time.

WE expect soon to receive samples of Dye Woods and Extracts from Messrs. Gifford, Sherman & Innis, N. Y., Proprietors of Poughkeepsie Dye Wood Works, established 1816.

MESSRS. WM. PICKHART & KUTTROFF, N. Y., will send us in time for next month's issue, samples of Alizarine for dyeing wool, product of the Badische Aniline and Soda Fabrik.

HENRY A. GOULD, Boston, sent us samples of Anilines, Poncau S., Poncau No. 2, and Water Blue 6 B., products of the Actien Gesellschaft, Berlin, which we will test soon.

WE had the pleasure of a visit from Mr. A. Q. Casselberry, of 18 Letitia Street, this city, representing the Turkey Red Dyeing Co., of Providence, and saw some handsome specimens of Turkey Red Dyeing done by them, equal to any imported, and will stand bleaching.

WE received from A. Klipstein, N. Y., samples of Saffranine A., medium shade, double, and Phosphine Prima, for Scarlet and Reds, product of Bindschedler & Busch, Bael, Switzerland.

MESSRS. E. SEHLBACH & CO., N. Y., informed us that they have a new fast blue for wool, a product of Messrs. Fred. Bayer & Co., Barmen and Elberfeld.

FOR WANT OF ROOM we were debarred from bringing out this month a sample of Acid Violet sent to us by Messrs. Wm. Pickhardt and Kuttroff, N. Y., last month, but we expect to do so in our next issue.

MESSRS. LUTZ & MOVIS have removed their office in Boston, from No. 12 Ludia street, to 37 Pearl street.

MESSRS. E. OAKEN & Co., have removed their office in Philadelphia from No. 4 Arch street, to 318 North Front street.

MR. A. KLIPSTEIN has removed his Philadelphia office from No. 11 South Front street, to No. 41 North Front street.

MR. ROBERT ZOELLER, representative of Bloede & Rathbone, Manufacturing Chemist, has an office at 53 North Front street, Philadelphia.

ERRATUM.—In the article "Something Quite New," by F. J. Bird, Cotton Violet no Mordant, page 19, January number, 1880, fourth line from the end, instead of 20 to 30 lbs., read 200 to 300 lbs.

OUR ATTENTION has been called to the specimens of Whitney & Mott's Compound, Indigo Blue Dye, by their agents, Wm. J. Matheson & Co., New York. They look pretty, but how practical, remains to be investigated.

QUERIES AND REPLIES.

Under this head we invite all our friends to make their inquiries on every subject connected with dyeing, etc., and we will endeavor to give them such information in answer as they are in need of. We also invite others to give us the aid of their experience in such replies. All will be welcome.

QUERIES.

45.—What is the instrument called actometer? I. G.

46.—Please state what is pyroigneous acid? W. C.

47.—Can you give a good deep black stain for willows that may without injury to the wood be dipped several times in hot water, but not boiled, nor treated with strong acids? N. Y.

48.—Please furnish me with a recipe for bluing with soap to stand the atmosphere. For laundry purposes.

K. J., NEWARK, N. Y.

49.—Be so kind as to state what is chrysianiline color, and how it is obtained? L. T., PHILA.

50.—Will you please to state to what order of colors belong the phenamine and the mauve? CH. D., FRANKFORD.

51.—What colors are Bleu de Paris and Bleu de Lyon?

T. S. GERMANTOWN.

52.—Who is the first to be credited with the aniline red?

D. C.

53.—Can you inform me of the common name for arachis oil?

C. L.

ANSWERS.

45.—A species of hydrometer for testing the strength of acids. It is also called acidimeter.

46.—This is the name formerly given to acetic acid. It is still called so, especially when used as a preserver of meat, provisions, etc. Considering that it is derived from Ligneous (wood) distillation, this denomination is more logical than the other, which is of a more general character.

48.—Alkali blue 3 B. will answer your purpose. Look at our Recipe No. 38, April, 1879.

49.—Chrysianiline is a yellow obtained by submitting for some time the residues from which aniline red has been extracted to a current of steam, when a quantity of the base passes in solution. Addition of nitric acid to this solution precipitates the chrysianiline in a hard soluble nitrate. Chrysianiline and its salts dye silk and wool a splendid golden yellow color. The aniline red above mentioned is also called rosaniline.

50.—Mauve and phenamels belong to the varieties of aniline obtained in 1860, by M. Scheurer Kester. Tyroline, induline, rosaniline, aniline, violine, violet imperial are of the shades claimed by the combination.

51.—They are aniline blues obtained by heating a salt of rosaniline for several hours, with an excess of aniline. The indigo blue azurine is produced by the mixture of aniline with chlorate of potassium, to which a quantity of hydrochloric acid has been added. This, and other aniline blues possess the property of acquiring under the influence of acids, a green tint called emeraldine.

52.—Dr. Hoffman discovered aniline red in 1858. This color was first produced by the combination of arsenic acid with an excess of aniline. But new processes have since been introduced to dispense with the use of arsenic, as frequently demonstrated by our recipes.

53.—Arachis oil is simply the peanut oil, much in use in Europe under various names. The consumption of peanuts in this country is so considerable that there is no supply for oil-making to any extent.

History of Aniline Dyes.

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BY F. PRUNIER, B. S.

(Continued from page 4.)

Purification of Raw Red.—Three different processes are employed: The first is to dissolve the raw material in an acid, and then to treat it with carbonate of soda or carbonate of lime: The second is by treating the raw red with an alkali; and the third is by the direct treatment of the raw material with boiling water, and double decomposition and precipitation with the chloride of sodium, (sea salt). Some manufacturers unite certain parts of these three processes.

We will commence by describing this last process, which is the

one the most used to-day, is the most economical and the least unhealthy for the workmen.

The raw red finely pulverized or hydrated, is treated by boiling with about five times its weight of water. The best thing to do is to operate in an apparatus under pressure, and according to the temperature or pressure in which we operate, we will be able to economize the duration of time, necessary for the dissolution of the raw red and will thus have a smaller volume of liquid, which will contain more coloring and will shorten the operation of filtering.

Accordingly as we operate in the open air or under pressure, from four to six hours will be necessary to effect the dissolution. The liquid is then filtered through cloth or canvas or what is better, a filtering press; from which it flows into the large reservoirs.

Some manufacturers submit this to a kind of purification. By permitting it to cool imperfectly it forms a deposit containing violet matters. Be that as it may, the liquid containing in solution the red is treated with sea salt in proportion of twelve to fourteen, to ten of raw red, in large vessels heated by steam, by double decomposition of the chloride of sodium, (sea salt,) and arseniate of rosaniline, (raw red).

There is formed chlohydrate of aniline, (*fuchsine*), and arseniate of sodium, which sea salt in excess facilitates its separation from the liquid. It is gathered in grume or clots on the surface, where it is collected. Then, when completely cooled, decanted into large reservoirs in which is deposited an additional quantity of fuchsine.

Fuchsine is sometimes delivered in this state, in commerce for certain uses. It is, however, always preferable to subject it at last, to crystallization.

(To be continued.)

Dyeing and Scouring of Garments.

(Continued from page 7.)

Our intention was to pass in silence some plants which were formerly much in demand, since they are no more used in the large cities since the introduction of dry scouring.

Besides, most of our dyers of to-day having some idea of chemistry, understand that when they have need to perform scouring by the humid process, they can economically replace these plants by means of a soluble and perfectly neutral soap, which is not very difficult to procure. However, as our journal is not alone intended for the dyers of the large cities,—as among our readers there are inhabitants of distant towns, where it is more or less easy to procure neutral soap and benzine, who can have easily at hand some of those precious plants,—we give here for their benefit a few lines upon the different kinds that can be utilized for washing and scouring.

The plant called soap-wort (*Saponaria officinalis*) has from remote antiquity been applied for this purpose. Dioscorides, the most celebrated herbalist of antiquity, speaks of its employment in the cleaning of stuffs and garments. In Germany it still bears the name of washing herb. The Lyonesse still use it to wash silks.

In Persia and the whole East they have used for a very long time, to clean cashmere shawls and other animal tissues, root of

Gypsophila struthium, a variety of *Sozonaria*. Pliny speaks of it under the name of Struthier's *Struthion*, which was employed to scour wool. The same plant was formerly known in France by the name *herbe aux foulons*, and it replaced soap in the several countries of the Mediterranean. It was called *Lanaria* in Calabria.

The Indians employed roots and the crushed fruits of several kinds of rarak or soap-berry tree (*Sapindus emarginata*, *S. Maduriensis*, *S. saponarius*, *S. senegalensis*) in the same manner.

The use of these plants is, moreover, found in all the regions of the earth and is continued among the natives, who have remained faithful to the practices and traditions of their ancestors. We also see that the washing and scouring of tissues is still performed in our time; in California, with the bulbs of the soap plant (*Phalangium promeridianum*); on the banks of the Parana with the pulp of the pods of a sort of inga named Imbo; in the Antilles and Jamaica with the juice of the leaves of the Agave Mexicana; in the island of Mauritius and adjacent islands with the leaves of the *Acacia Lebby*; in the Philippine Islands with the juice of a gignatic liane named *gogo*; in Abyssinia with the seed of a *Phytolague* (*Phytolacca Abyssinica*); in Chili and Peru and in the whole of South America with the interior bark of the *Quillaja saponaria*, known under the name of soap bark or Panama bark.

The calve's foot, or *Arum maculatum*, is used by the peasants of the west of France, and the Luzerne root is employed by those of the south of France; the inhabitants of Ireland and several others use green Indian chestnuts and the broth of potatoes.

All these soapy plants appear to owe their property of rendering water into suds, and their detergent action to the presence of saponine, which leaves the tissues supple and does not eat off delicate colors as the alkalies do. This proves also, that chance and observation have brought about everywhere the same industrial methods.

(To be continued.)

Application of Chemistry to Textile Art and Dyeing.

(Continued from page 108, Vol. I.)

Before sulphuring, woolen goods must be scoured and rinsed, and silk "cooked" and free from gum. They are then introduced moist into the "sulphur chamber" where they are hung on rollers, or otherwise arranged so as to present as large a surface as possible to the action of the gases. A part with sulphur is placed on the floor and ignited, and the chambers closed, the access of air necessary to support combustion being regulated by openings in the walls. About one pound of sulphur is used for twenty pounds of silk, and five to six pounds of sulphur for one hundred pounds of wool. After the sulphuring, which lasts from 12 to 24 hours, woolen goods are again passed through soda and soap baths which must be quite weak, and after these operations have been repeated once or twice, they are "bleued." Sulphur bleaching alone will rarely produce a perfect white, and even after repeated exposures in the chamber, the goods generally have a yellow shade; this is neutralized by the "bleining bath," which, besides soap, contains minute quantities of carmine, of indigo, or aniline blue.

Bleaching by means of sulphur was already known, and

practiced by the ancients, and very little improvement has been made in this branch of manufacture in our times. This is the more to be regretted, as the process is very imperfect and unsatisfactory, and difficult to control with anything like the accuracy which the exigencies of modern industry require. If the supply of moisture in the chamber is insufficient, sulphur is apt to sublime and deposit as an incrustation on the goods, which it is difficult to remove if there is too much moisture, and sufficient air is present, sulphuric acid is formed, and settling in drops on the fabrics corrodes them, producing yellow-brown spots and rendering them unsalable. It is also difficult to dispose the goods in such a manner in the chamber that the gas can act uniformly on every portion of them; for the moisture with which they are impregnated accumulates by virtue of the laws of gravity in the lower portions of the suspended goods, and a more energetic action takes place there than in the upper portions. To obviate these grave objections, the use of a solution of sulphurous acid has been frequently proposed and recommended, and, as was expected, the bleaching proceeded far more uniformly, but other difficulties presented themselves which have thus far prevented the general introduction of this method. It takes nearly twice as long to produce the same effect when the solution is used; the solution cannot be kept long without losing in strength, and besides a simple, practical apparatus and process for making the solution just when wanted, and in the quantity required, has not yet been devised.

(To be continued.)

Verviers.

WOOLEN AND CLOTH DYES FOR MEN'S WEAR.

P. FRUNTER.

(Continued from page 6, Vol. II.)

BLACKS.

Blacks are obtained by the mixture of the three primitive or fundamental colors, said by the union of the blue, red and yellow, more or less darkened.

The materials the most in use are, indigo, nut galls, sumac, logwood, madders, cutch, divi-divi, fustic, quercitron bark, etc.

Blacks require very great care, even more care than for any other color; the most important point is in the selection of mordants from it, and on the quantity will depend the beauty and solidity of the shade obtained.

Many dyers suppose blacks do not want as much care as other colors, but this mistake is shown by the few of them who obtain deep and velvet blacks, or who obtain black regularly.

The mordants used for the various kinds of blacks, such as black-blacks, purple-blacks, blue-blacks, greenish-blacks, are bichromate of potash, chrome-alum, copper salts, iron salts, tin salts, tartar.

Berthollet, a learned French chemist, said that the best proportions are the equivalent necessary in tannin or gallic acid to enter in perfect combination with the salt of iron, in order that the oxide of iron should be perfectly neutralized. This learned man remarks that it is preferable to have the iron in excess, the tannin being dominant would oppose the precipitation of the coloring mat-

ters,—it would even dissolve them. He proves in fact that a black is restored to a gray shade if boiled with nut gall.

We must observe that the dyeing precipitated upon the wool by the combination of the tannins given by nut gall, sumac, etc., with the oxide of iron, show at first only olive or gray shades, which get to be fair blacks only when exposed in contact with air, in a wet state.

Blacks are deeper and much more brilliant and solid than those made from baths composed of several other colors, such as indigo vat, madder, cutch, fustic, logwood, etc.

The cheapest blacks are obtained from the following bases: logwood, fustic, quercitron bark, copperas, bichromate. The finest and fastest have for bases, indigo vat and tannin. In some places I have given these names to blacks in accord with the reputation acquired by the fabrics manufactured there from time immemorial. Such are the noir de Sedan, noir d'Elbeuf, noir de Bedaricux, noir de Montauban, noir de Vienne, noir de Verviers, noir de Tours, noir de Geneva, noir de Beaume. Some others obtained their names from the special titles given to the fabrics, as noir à la Jesuit, the name of a cloth worn by religious of that order.

Supposing it to be agreeable, and that it may be useful for dyers and manufacturers, for match samples, we will give hereafter in a separate column under the name of *Ancient Blacks* the formulas of the most renown. Under the name of *Modern Blacks* are those more in use in Verviers.

(To be continued).

\$600 in Prizes.

I have often thought if prizes were offered for special achievements, it would be an inducement to many a man of fair or average ability to use his spare time in seeking to put into practical and tangible form ideas that may at some time or other have occurred to them, but for want of the proper stimulus and a definite object in view have lain dormant, which, if a sufficient impulse had been given, would at least in some cases have resulted in some pecuniary advantage to themselves, and of much benefit to the general public.

To my mind it does not seem possible that the large number of hands employed in the dying trade can really have from year to year, no original ideas thrust upon them. For, practical experience I think ought to be the best school for development. But no doubt men are often deterred by the fact that if they have something good, they do not know how to make anything of it, and it is a generally accepted doctrine, that every laborer is worthy of his hire.

I would be very glad to join an organization,—say of subscribers of the TEXTILE COLORIST, who feel an interest in this matter to subscribe to a general fund for this purpose; to offer prizes to all comers for the best invention on a certain subject, or the best answer to a certain inquiry.

The questions may be asked by any of the members, and be written or printed, and sent out by an authorized agent chosen by the subscribers, each subscriber could then vote for the subject he thinks of most importance. They would thus be taken in the order in which they voted, and a jury of arbitration qualified to make proper terms appointed to decide on the merits of the answers.

In some such matters of great interest, I am quite sure may be elicited that would in the course of the year more than repay a \$4.00 or even a \$5.00 subscription, or whatever the terms may be.

I think the suggestion is worthy the attention of all representative men in the dyeing trade, and I hope at least that they will not be backward in coming forward with their opinions upon its merits.

As everything must have a start, I am prepared to commence it on my own responsibility, as follows:

I will give \$100 for a direct *Black* from *Aniline* that will dye as easily and as cheaply as other aniline colors on wool, silk, cotton, and mixed goods.

I will give \$100 for a good *Black* on *Mixed Goods* by any process whatever, provided it is dyed in one bath within two hours, at no greater cost than that of the ordinary process.

I will give \$100 for a formula by which *rays* can be bleached from wool dark stock to a light drab or grey (as per sample to be supplied by me), at a cost of about 1 cent per lb., provided that the fibre be not injured thereby.

I will give \$100 for a mordant that can be used with *Orchil*, causing the work to take up all the color without injuring the shade or adding much to the cost.

I will give \$100 for the formula how to make a Bismarck brown that will be the same strength and shade, and stand a slight acid test without any sediment or additional cost of manufacture; or I will give \$50 to any one giving me the information where such a brown can be bought.

I will give \$100 for a formula to make a violet from aniline or litmus that will be as cheap and easy to make as the ordinary violets, provided that with the acid test it will turn red, or with alkali test blue, but not discharge with either test, and will return to its normal shade by opposite treatment.

Or I will give \$50 for the information where I can buy it at about the same price as other violets.

All inquiries to be made direct to me,

F. J. BIRD,

212 St. Mark's Ave., Brooklyn, N. Y.

On Mordants.

BY F. PRUNIER, B. S.

(Continued from page 5, Vol. II.)

The two alums the most widely known, and employed in commerce and printing, are the following:

1. Alum with base of potash or sulphate of alumina and potash.
2. Alum with base of ammonia or sulphate of alumina and ammonia.

We often find another designated ammoniacal alum, which is not, in fact, more than a variable mixture of the above-mentioned two. Its composition will vary according to the proportions of the mixture. The first is the oldest known, and is to be understood when we use only the word alum.

The following is the composition of those two double salts (alum.)

	Alum with base of potash.	Alum with base of ammonia.
Sulphate of alumina,	36-20	38-64
" " potash,	19-54	60-00
" " ammonia,	00-00	12-88
Water combined, .	45-46	48-48
	100-00	100-00

According to these figures alum with base of ammonia appears to most advantage, since it contains a little more of alumina, particu-

larly when it is employed to make lakes or colors so applied or when the alumina plays the principle role.

But this is not always the case, even in dyeing; in many cases the alum does not necessarily always act by fixing the alumina on the fibre, so as to draw the color.

It acts also in these cases simply as a salt, having the property to render insoluble the coloring matter, thus facilitating the precipitation of the color on the fibre, or in its pores and giving to it a certain shade, as the sulphate of soda, the bi-tartrate of potash, or a fuchsian acid would act. We see that in these cases, that which contains the least water is to be preferred to ordinary alum (sulphate of alumina potash.)

Both these alums may contain a greater or less quantity of iron, which depends upon the raw material employed in the manufacture, as well as upon the care with which they are purified.

It is easy to recognize the presence of iron in the alum, by the aid of a solution of yellow prussiate, which gives a blue coloring, and is more or less marked in proportion to the quantity of iron contained.

We will give, further on, another purifier for commercial alum, or a way to manufacture a pure article, which would be useful, should the reader find any difficulty in obtaining it pure for special uses.

(To be continued.)

Tinctorial Glossary.

ACETIC ACID, formerly called *radical vinegar*, is the sour part of vinegar, and that to which its peculiar properties are owing. It is obtained: 1. By the fermentation of saccharine matters; 2. By the distillation of wood. The product of the first constitutes when diluted the common vinegar, which in France is made from wine, and in this country from an infusion of malt called wort. The acetic acid from wood is obtained by the destructive distillation of the dried branches of trees in hollow iron cylinders. The hard woods, such as oak, ash, birch and beech, are alone used. The average product of crude acid from 800 lbs. of wood is 35 gallons. This acid is now largely employed when purified as a metallic solvent, and oxidizes when pure (except at low temperature when it crystallizes) is volatile, colorless, and of a very pungent taste. In this state it is used in chemical investigations. In a less pure state it is employed for preparing acetate of sugar of lead, acetate of copper, (verdigris), acetate of alumina, largely used by calico printers and dyers as a mordant. It is frequently adulterated with sulphuric acid, which however is readily detected by the addition of acetate or sugar of lead. An insoluble sulphate is precipitated if sulphuric acid is present.

ACID.—A most important class of chemical compounds distinguished by the following general properties: 1. Their taste is for the most part sour, acid, and corrosive. 2. They generally combine with water in every proportion with a condensation of volume and evolution of heat. 3. With a few exceptions they are volatilized or decomposed at a moderate heat. 4. They usually change the purple colors of vegetable to a bright red. 5. They unite in definite proportions with the alkalis, earths, and metallic oxides,

and form the important class of *salts*. This may be reckoned their characteristic and indispensable properties. Some acids are gaseous in form; others are fluid or solid. Most of them are colorless; some are inodorous, while others are pungent. The most important in a commercial point of view are the acetic, benzoic, boric, citric, gallic, hydrochloric, nitric, nitrous, oxalic, prussic, sulphuric, sulphurous and tartaric.

ACIDULOUS WATERS.—Mineral waters which contain free acids in solution.

ALBUMEN.—A constituent of the animal and vegetable fluids and solids which enters into commerce in a dried state, chiefly the albumen of the egg and of the blood. The principal use of it is in photographing and calico printing.

ALKALIES.—A class of chemical bodies characterized generally by their peculiar hot, bitter, and caustic taste; by their changing the colors of vegetable blues to green, and yellows to brown, and by their neutralizing acids in forming with them the class of compounds called salts. The principal alkalies are ammonia, potash, and soda. The value of any alkali is determined by an *alkalimeter*, a graduated instrument which shows the quantity of acid neutralized by a given weight of acid neutralized, and hence the amount of pure alkali contained in it.

ALKANET is the root of a species of bugloss (*Anchusa tinctoria*), a native of the warmer parts of Europe. It is of a dark-red color, and white within, and imparts an elegant tint to alcohol, wax, and to all unctuous substances. The coloring matter is confined to the bark, and the small roots are preferred as having most bark in their bulk. The herb is imported from Montpellier, (France), and from the Levant.

ALKOOL.—A black dye; a preparation from antimony used by females in Eastern countries to tinge their eyelids. Also called *Ibenna*.

ALUM.—A salt of great importance in the arts, consisting of a tertiary compound of *alumina* or pure argillaceous earth, potassa, and sulphuric acid. Alum is sometimes found native, but by far the greater part of that which is not in commerce is artificially prepared. It is brittle, colorless, inodorous, and astringent. The best is the Roman, or that which is manufactured near Civita, Vercchia. But some good qualities are manufactured in the United States. The principal use of alum is in the art of dyeing as a mordant for fixing and giving permanency to colors which otherwise would adhere but for a short time.

AMMONIA, (volatile alkali or spirits of hartshorn).—A pungent volatile substance of extensive use in industries. It is formed during the putrefactive fermentation of animal matter. When pure it is a gaseous body, composed of 3 equivalents of hydrogen and 1 of nitrogen. The aqueous solution of ammonia is prepared either by pressing the gas as it is found directly in the water, or by distillation from sal ammoniac, burnt bone, &c.

ACETATE OF AMMONIA is obtained by adding sesqui carbonate of ammonia to diluted acetic acid. The sesqui carbonate is prepared by sublimation from a mixture of hydrochlorate or sulphate of ammonia and chalk. Murinate of ammonia or sal ammoniac was originally procured from Egypt, where it was made from the soot of

camels' dung. It is now prepared abundantly in this country by the decomposition, by sulphuric acid, of the ammoniacal fluid given off during the preparation of coal gas. Sal ammoniac is extensively employed in the arts. It is used in preparing *aqua regia*, in soldering some of the metals, in turning iron and copper, in the preparation of dyes, and also in various chemical manufactures.

ANIL.—The Spanish name for indigo.

ANILINE.—A colorless, oily and poisonous substance, having a faint vinous odor and an aromatic burning taste. It dissolves in ether, alcohol, and in fixed or volatile oils. When exposed to the air it acquires a yellow or red color, which is always noticed in commercial aniline oils. It forms a numerous class of salts, most of which crystallize readily. It was discovered in 1826 by Unverdorben, as a product of the distillation of indigo, and was named from anil, the name of the American species of the indigo plant. Aniline is generally obtained from the basic oil of coal tar. The beautiful blue color which it strikes with a solution of bleaching powder, is sufficient for its recognition. It has met with an important application in the arts in the production of beautiful dye colors, which are very intense, a few pounds of the dye being capable of coloring some miles of fabric. Aniline colors are used for the production of brilliant tints on cotton, wool, and silk; also for ink, for coloring leather, soaps, candles, ivory, bone, etc. The costs of aniline dyes are counterbalanced by their tints and the simplicity of dyeing. The history of aniline has its legend, like many other discoveries. It is reported that an accidental fall of a piece of goods in coal tar caused the washing of it, by mistake, with liquid ammonia instead of soap water, when suddenly some peculiar and beautiful colors spread all over the wet tissue. Patents taken by the discoverer have led to a great deal of litigation between various claimants in France.

ANNATTO, or amotto, is a reddish dye,—the inspissated extracts from the pellicles of the seeds of the *Bixa orellana* found in the East and West Indies, but chiefly imported from Brazil. It is used by dyers for giving more or less of an orange cast to the simple yellows. It is also used for coloring cheese and butter.

ANTIMONY YELLOW.—A preparation of antimony, of a durable color, used in enamel and porcelain painting.

ANTIBERTIC.—Any substance which prevents decomposition, as glycerine, and which is used on yarns, sizing, etc.

BARILLA (OR SODA ASH).—An impure carbonate of soda, obtained by leaching the ashes of sea weeds. It is brought from Sicily and Spain in hard, porous masses. The value of barilla depends upon its purity. It usually contains from 16 to 24 per cent. of pure carbonate of soda. It is mostly used in the manufacture of soap and glass and in bleaching. Barilla is much less used than formerly, on account of the cheapness with which soda is obtained from common salt.

BERLIN BLUE.—A blue metallic pigment; fine variety of the Prussian blue.

BERLIN WOOL.—The name given to various kinds of beautifully dyed, soft, elastic worsted yarns, produced at Berlin, Prussia.

BETEL.—An East Indian plant, the leaf of which, mixed with

the fruit of *Areca palm* or catechu, forms a narcotic mastication, giving to the lips and tongues of the chewers a reddish tinge, which is esteemed ornamentally by males and females of the Malayan Archipelago. This may make a new dye.

BICK. is the name of two blue and green pigments which are native carbonates of copper. Blue is sometimes called *mountain blue*, *Hamburg blue* and *mineral blue*. Green blue has also the names of *Hungarian green*, *malachite green*, *emerald green* and *mountain green*.

BETULINE.—A colorless resin or gum extract from birch bark.

BIRCH.—A graceful forest tree in various species. The bark yields a yellow dye and an essential oil, used in Russia to impart the peculiar odor to Russian leather.

BISTORT ROOT.—Root of *Polygona bistorta*, a powerful astringent.

BISTRE.—A brown pigment useful for water-colored drawings; made from the soots of various kinds of burnt wood.

BLACK.—The darkest of colors produced by the total absorption of all the rays of light. It is the opposite of white. The principal constituents of paints and dyes are vegetable blue-black, ivory-black, cork black, lamp black, Spanish black, aniline black and Indian ink, besides dyewood, etc.

BLACK ASH.—An impure carbonate of soda, which when refined is called white ash,—the wood of *Fraxinus sambucifolia*.

BLACK CHALK.—A kind of black clay containing a large quantity of carbon. It is found natural and also manufactured from ivory-black and fine clay mixtures. The fine soots produce artists' crayons, and are used for drawing on paper.

BLACK FLUX.—A preparation of cream of Tartar ignited in a close crucible; a carbonate of potash and charcoal.

BLACK OAK.—*Quercitron*.

BLADDER GREEN.—A pigment preparation from Persian berries.

BLANCHIMETER.—An instrument for measuring the bleaching power of chloride of lime and potash.

BLANCHING.—The process of whitening anything.

BLEACHING.—The chemical process of removing colors from cloth or vegetable substances. It goes through several series of procedures,—the removal of greasy, dirty, resinous or starchy particles, etc.

BLEACHING POWDER.—The name given to chloride of lime, which is the chief substance employed in bleaching. It is prepared by passing chlorine into chambers containing fresh-slacked lime in fine powder, by which the chlorine gas is copiously absorbed with extrication of heat. When agitated with water, a portion is dissolved, and the solution, called *bleaching liquor*, contains both chlorine and lime. Its power and value may be estimated by its action upon a solution of indigo of known strength. The chief seats of the manufacture are Glasgow, New Castle and Lancashire, England, from whence enormous quantities are annually exported to the United States. Imports in 1878 amounted to 49,285,054 pounds, valued at \$598,813. It is free of duty. Some American chemical works are attempting to produce it; the Philadelphia Salt Company is making some at Pittsburgh, Pa.

(To be continued.)

Steam Alizarine or Extract Style.

BY "CALICO PRINTER."

(Specially contributed to the *Manchester Textile Manufacturer*.)

Some time ago, finding that the extract style would be one of the chief styles, especially when combined with other colors, and hearing from good authorities that our leading calico printers were paying heavy sums for this process, I determined to put into operation a series of trials, in order to find the best method of producing this style, keeping in mind the following necessary adjuncts, viz.: a good pure white, and a good cheap working color.

The first experiments were made to prove whether the cloth required a preparation prior to printing, and if so, which preparation would be the most suitable. I therefore took six pieces, marked 1 to 6, and treated them as follows:

1. Without preparation.
2. Prepared with a 3 per cent. solution of oleine, made from castor oil.
3. Prepared with a 3 per cent. solution of olein made from olive oil.
4. Prepared with a 3 per cent. solution of olein, made from castor oil, with one lb. of stannate of soda per gallon.
5. Prepared with a 3 per cent. solution of oleine, made from olive oil, with one lb. of stannate of soda per gallon.
6. Prepared in stannate of soda, at 6° T., then passed through weak sulphuric acid, at 2° T., washed well and dried, then passed through a 3 per cent. solution of "castor oil" oleine and dried.

I then had all the pieces printed with the same colors, steamed and soaped together. After drying I compared them, with the following result:

1. Very poor red.
2. Very fair red; white not perfect.
3. Fair red, but not equal to No. 2; white as No. 2.
4. Good red, and white good.
5. Very fair, and white good.
6. Very good, and the best white.

I also found that in other shades, such as black, aniline green, blue, etc., were much better in No. 6 than in any other, consequently have adopted that preparation for all my other trials.

My next trials were made with the intention of getting the best shade of red possible. I first made many trials with different mordants, and out of these trials I chose two, one of which was got from acetate of alumina, made by dissolving the hydrate of alumina with acetic acid; the other was obtained from nitro-acetate of alumina, both of which recipes will be found below.

The alizarines necessary for this style may be put into two classes, the red requiring generally a scarlet shade of alizarine. The pink a blue or purple shade of alizarine.

The following is the recipe that I found to give the most satisfactory result:

THICKENING.

- 30 lbs. of condensed water free from iron.
- | | | |
|----|---|--|
| 9½ | " | wheat starch. |
| 1 | " | British gum. |
| 10 | " | acetic acid; boil well in a porcelain-lined, or ordinary |

copper pan, then cool, and when quite cold add
1½ lbs. of "castor oil" olein, 50 per cent.
"RED" COLOR.

- | | |
|---|--------------------------------------|
| 1 | gallon of above thickening. |
| 1 | " scarlet alizarine 10 per cent. |
| 5 | noggins acetate of alumina at 12° T. |
| 5 | " nitrate of alumina. |
| 3 | " acetate of lime. |
| 1 | ounce sulphocyanide of potassium. |

"PINK" COLOR.

Use blue or purple alizarine instead of the scarlet shade, and reduce to the required shade with the above thickening, always keeping the same relative proportions between the alizarines and mordants.

ACETATE OF ALUMINA AT 12° T.

Hydrate of alumina, made by adding soda crystals in solution to a solution of alum, filtering, then washing the precipitate well, and then dissolving in acetic acid, bring to 12° T.

NITRATE OF ALUMINA.

- | | |
|---|--|
| 1 | gallon of boiling water. |
| 8 | lbs. nitrate of lead. |
| 8 | ozs. soda crystals. |
| 3 | lbs. alum; stir well up until dissolved, let settle, and use the clear liquor. |

ACETATE OF LIME.

Obtained by acting upon chalk with acetic acid.

NITRO-ACETATE OF ALUMINA.

- | | |
|---|---|
| 2 | gallons of boiling water. |
| 3 | lbs. nitrate of lead. |
| 4 | " acetate of lead. |
| 7 | " alum; dissolve, let settle, and use clear liquor. |

SULPHOCYANIDE OF POTASSIUM.

Can be obtained from any chemist; it is most useful, as it prevents any iron salt from injuring the shade of red.

After printing, run through one of the new ageing machines if possible, then steam either in cottage or open steaming for one hour, take out and fix through a boiling solution of tartar emetic at 2 oz. per gallon, if associated with aniline colors, if not it is needless, soap twenty minutes at 130° F. and 20 minutes at 160° F., and then wash well. It is often preferable, if the pattern of red is heavy, to fix it as above, and wash well prior to soaping, as it then keeps the soap backs clean.

There are now being used at many large works open soaping machines, with revolving brushes, which are much preferable for those styles than the ordinary soap backs.

(To be continued.)

Silk Waste Scouring.

The silk waste trade has an importance that can be appreciated, from the fact that for each pound of regular silk manufactured there are from 12 to 14 pounds of rejection or burring, which must be spun by special machines and processes to furnish goods now which a few years ago required first quality silk. This rejection or burring is produced by several causes: 1st. From defective cocoons,

such as those broken by the escape of the worm, and as the double cocoons containing two or more worms or more, and which cannot be reeled; 2d. From the ordinary waste in working, silk escaping from the cocoon before and after the reeling operation, besides the fly and fragments. The scouring process for this material consists in softening the gummy matter of the silk by immersion in warm water kept for several days at a certain temperature. Then the washing process removes the gum, and the action of steam prepares the material for spinning.

This washing is done by beating instruments, flogging and opening the silk, while a strong stream of water falling in the washing tub carries off the impurities. The old and hard cocoons require also a complete treatment of this kind to become soft and available. When the material is dried, it is placed on an endless apron carrying it to feeding rollers armed with pins, from which a rotating comb forces it into a lap around a cylinder. This lap is transferred to a dividing machine furnished with combs at intervals. Then the silk is cut in lengths and placed between boards united by hinges; hence subjected to another combing process which shall be described in the AMERICAN TEXTILE MANUFACTURER, to which this mechanical operation belongs properly.—*Technologist.*

Yellow Colors.

BY MARIUS MOYART.

The ancient dyers knew no application of yellows but the ochres, oxides of lead and sulphuret of arsenic (orpiment and realgar), strong dyes, but not bright. These sulphurs had a fine tint, but they are poisonous, and, imperfectly covering, are refractory to mixed materials. It is, however, probable that they dyed also with saffron, gaude, and various other vegetable indigenous dyes capable of a yellow tint. But nothing is quite certain about it. Modern chemistry has discovered several yellow colors of importance. The Naples yellow (antimonate of lead) and the mineral yellow (oxide of lead) and other colors deriving from mixtures of both for oil painting specially.

It is the celebrated French chemist, Vauquelin, who discovered in 1797 the chromes and its constituents so useful to industries. The yellow chrome, like the Prussian blue, can be applied on tissues. It is used considerably in calico prints. The yellow of cadmium is very bright and fast. It is a sulphur of a peculiar metal, the cadmium, discovered in 1817, by Stromeyer, in zinc ores. We can add to these yellows the yellow lakes and the Indian yellow, assuredly unknown in ancient times.

The modern colorists have also discovered the remarkable silk dye from azotic acid and picric acid. This has a Lyonesse origin, as many other new coloring matters have. The Guinest blue is from Lyons. Prussian blue is really also due to Raymond of same city. Lamaline comes from Moers. Guinon and Marnas, who were the first to put out the artificial blue derived from coal tar. The inventor of the fuschine is also a Lyonesse dyer.

By the application of picric acid, and through the teachings of Prof. Lambert, the gaps of some desired yellows were partially filled. There is yet a great want in that line of colors. Several artificial

yellows, derived from aniline or naphthaline, have been tested, but not quite satisfactorily. They are easy and comparatively economical, but solidity is yet wanting. Some fear water or heat, others light or acidity, where natural colors fail not. However, progress is working constantly, and there is no reason to absolutely doubt of the future dethronement of king curcuma, etc.

Test of Indigo.

BY M. V. TANTIN.

The process applied at the "Industrial Schools" of France to test the value of indigo, an easy matter for anybody, is as follows:

1st. Take an average sample of the indigo sold, and scrape it with a knife into powder—5 grammes are sufficient.

2d. Pulverize it very fine, and sift it through a fine sieve of 100 nets to each square centimeters.

3d. Take of this 30 centigrams, or 30 hundredths of a gram and dissolve it in sulphuric acid pure; place this into a sort of phial called *matras of assay*, add to it 10 grammes of broken glass well washed and dry.

4th. Heat the *matras* in a bath to 60 or 70 centigrades during four hours, stirring once every half hour. The dissolution of indigo being complete, put it in three litres of water and let it settle.

5th. Take of this liquor 10 centimeters, and place it in a glass colorimeter, graduated. Take an equal quantity of prepared standard liquor to bring the base of comparison by a known degree of quality, and place it also in another graduated tube or colorimeter.

6th. Then take a small measure of water and pour it slowly and gradually into the test tube and stir it by an india-rubber air tube. When the coloring degree equals that of the standard, stop adding water, and note the quantity that has been required to reach the point. Of course the more water used, the more value has the indigo in comparison with the given quality of which the constituent as a coloring power is known before hand. It is obvious that the indigo in test must be of same sorts. The Bengal indigo being superior to the Java or Guatemala, it would not be correct to compare them with each other. This simple method, with proper graduated tubes and uniform glasses and light can be successfully practiced by any one familiar, at sight, with the indigo colors.

The Washing of Wool.

Complaints are often heard at the present time, that the colors are not so durable as formerly, and that both wool and cloth lose much by contact with air. This, it is asserted, is principally due to imperfect washing. Where all the grease has not been removed from the hair, the dye naturally adheres to it, and cannot sufficiently penetrate the substance of the fibre; when, therefore, such wool is milled, it will lose through the action of the soap the greater part of this grease, and also with the latter the dye taken up by it, making the cloth loath duller. It will not afterwards give off any more color, but will not have the same brightness as before the milling. Where the cloth is not much milled, it will with this extra

coating of fat lose much color and, wear by contact, and the dyer be blamed for bad work, when in reality he has actually been obliged to put more dye on the cloth than he otherwise would have done. This refers principally to black, dark blue, and brown.

Where wool has been washed with waterglass, it often happens that this has not been well washed out in tepid water; as a consequence the wool is covered by a thin crust of the silicate of soda, which has all the disadvantages connected with imperfect washing, and even in a higher degree than where the wool has been washed by the older method.

Where the wool has been well washed on the hack of the animal, it still happens that it sweats more or less during the next four to six weeks if stored; if, then, it is washed afterwards, the grease will come well off. If, however, the wool after being clipped is not allowed any time for sweating, but is at once sent to the wash, it will sweat a little afterwards, and in this way also create the evil mentioned above. This grease when left in, will to a certain extent be decomposed later on by contact with the atmospheric air, and in this manner also make the dye fugitive, all of which points to the conclusion that many colors would be faster if the wool was more thoroughly washed in the first instance. Nor is an extra washing a loss to a manufacturer who wants reliable dyeing, for cloth made from such perfectly cleansed wool will require less alkali and soap in milling and washing, and will give in every respect more satisfactory results.—*Das Deutsche Wollengewerbe*.

Tartar Blacks.

Tartar blacks give the most satisfactory results in two baths,—galling and dyeing. For 100 kilos. light cloth:

Tartar, . . .	15 kilos.
Copperas, . . .	5 "
Sulphate of copper, . . .	3 "
Extract of Campeachy, . . .	5 "
Sumac red, . . .	5 "
Extract of yellow wood, 800	"

Boiling $\frac{1}{2}$ of an hour; taking out and aerating all night; next day good rinsing and draining; second boiling $\frac{1}{2}$ hour in a bath with 5 % extract of campeachy.—*Teinture Pratique*.

Black Varieties.

The fast and bold blacks are those obtained through a preliminary indigo bath in the tub, and the boiler dye afterwards as a completion. This blue footing has the value given it by the consumer of the dye, who can use poor or rich indigo. This first blue bath must be followed by a good rinsing, and the black dye must be thus made for 200 kilos. of cloth:

Sumac, first quality, 50 kilos.

Campeachy, . . . 35 "

Three hour's boiling; then taken out, aerated, and returned into the boiling bath, with the addition of 10 kilos. copperas. This operation must be repeated twice, at an interval of one hour, up to the third and last bath, which can be limited to $\frac{1}{2}$ hour. At this last

period, should the black be unsatisfactory in depth and shade, an addition of campeachy would be necessary and perhaps a small quantity of yellow wood. It is important that the cloth in the bath should not be compressed or unevenly immersed. The boiling must be easy and floating as well as uniform, otherwise the dye may be irregular. The reputation of the blacks of Elbeuf and Louviers is due to the great care, attention and patience in the correct manipulations.—*Ibid*.

Proved Recipes for Colors.

BY CALICO PRINTER.

(Specially Contributed to the Manchester Textile Manufacturer.)

BLACKS.

For Extract Styles (Steam.)

- 160 fl. oz. logwood liquor at 14° T.
- 53 " bark liquor at 12° T.
- 53 " acetic acid at 8° T.
- 7 " olive oil.
- 24 lbs. wheat starch.
- 4 ozs. potassic chlorate.
- Boil, cool, and add 30 fl. oz. of chromic acetate, 25° T.

Chromic Acetate.

- 1 gallon boiling water.
- 7½ lbs. chrome alum.
- 7 " sugar of lead (white.)

Turkey Red Discharge.

- 2 gals. logwood liquor at 20° T.
- (1) 2 lbs. starch.
- 1 quart resin oil.
- Boil and cool.
- (2) 5 quarts iron liquor at 24° T.
- 1½ lbs. starch.
- Boil, cool and add
- 15 fl. oz. nitric acid at 60° T.
- Mix Nos. 1 and 2 together and they are ready for printing.

Resin Oil.

- 1 gallon linseed oil.
- 1½ lbs. resin.
- Boil well and cool.

Aniline Black for Dyed Work.

- 1 gallon water.
- 1½ lbs. starch.
- ½ lb. British gum.
- 1 " chloride of soda.
- 1 fl. oz. aniline oil.
- Boil well, cool, and add 1 lb. aniline salt (neutral) dissolved in 15 fl. ozs. of water; when wanted add either

- 2 grs. vanadate of ammonia or
- 5 oz. sulphide of copper.

Aniline Black for Steam Work.

- 1 gallon water.
- 1½ lbs. starch.
- 9 ozs. potassa chlorate.
- Boil, and when nearly cold, add
- 12 ozs. potassic ferrocyanide.
- Dissolve, cool, and add
- 14 lbs. aniline salt.
- Dissolve in
- 25 fl. ozs. water.
- This color will keep for 36 hours only.

For Cratone Steam Styles;

- 1 gal. iron liquor at 24° T.
- 24 " logwood liquor at 24° T.
- 50 fl. ozs. acetic acid at 8° T.
- 10 " olive oil.
- Boil and add, when part cooled,
- 10 fl. ozs. turpentine.

Dyeing Felt Hats.

Blue Black (for 60 Hats).

Prepare a warm bath with solutions of

- ½ lb. bichromate of potash, and
- 1 lb. sulphate of ammonia.

Boil for ten minutes, and refresh this bath by adding some cold water, put the hats in, after having well wetted them with warm water, and boil gently for two hours, moving them about repeatedly. Now take them out and leave to cool, and dye without rinsing in a boiling bath to which a decoction of 10 to 12 lbs. logwood has been added. Put the hats in and leave them for three hours, keeping

the temperature at the boil. According as more or less logwood is used the deeper or lighter will be the shade obtained.

Deep Black (for 50 Hats).

Prepare a bath with

- 8 ozs. black lead,
- 3½ ozs. bichrome,
- 1½ ozs. sulphuric acid, 66°.

Boil this mixture for ten minutes, then refresh the bath with cold water, and put the wet hats in and leave to boil for one and a half hours, after which they are taken out and left to cool. Now dye in a bath composed of the decoction of

- 12 lbs. logwood.

The hats are to be put into the dye bath without rinsing them. Work for a quarter of an hour in the bath, and boil gently for half an hour longer, care being taken to move the hats during this period. Take out and darken in a hot, but not boiling, bath containing ½ lb. blue vitriol.

Cool Black (for 50 Hats).

Mordant with

- 8 ozs. black lead,
- 5½ ozs. bichrome,
- 3½ ozs. sulphuric acid.

As above, then dye in fresh bath with

- 12 lbs. logwood,
- 1 lb. fustic.

Boil gently for one and a half hours, and darken for half an hour with ½ lb. blue vitriol.

Brown (for 50 Hats).

First dye them blue with indigo and afterwards rinse. Next prepare a boiling bath with

- 1 lb. alum,
- ½ lb. tartar.

Boil eight minutes, immerse the hats, and boil for two hours, moving them meanwhile at short intervals, afterward taking out to cool and rest for twenty-four to twenty-eight hours. Now dye in warm bath composed of

- 3 lbs. madder,
- 1 lb. gallnuts, in fine powder.

Immerse the hats, and raise the temperature gradually, and boil for half an hour gently. Take out, leave to cool, add 1 lb. copperas to the dye bath, immerse hats again, heats strongly, but without boiling, then take out and rinse. To give a black brown appearance to the hats, add 1 lb. more copperas, and leave to boil for half an hour.

Cherry Brown (for 50 Hats).

This recipe gives a brown of great beauty and evenness, and does not harden the hats. This color is especially suitable for woollen and hair hats of good quality. Boil some water in a copper pan, and add

- 14 ozs. black lead,
- 5½ ozs. bichrome,
- 6½ ozs. alum,
- 1 oz. muriate of tin,
- 5½ ozs. sulphuric acid.

Boil for eight minutes, then place the hats in the bath and boil gently for two hours. After which remove the hats and leave to cool without rinsing. Now dye in a warm bath containing the decoction of

- 8 lbs. Brazil wood.

Work them well, and boil gently for three-quarters of an hour and then rinse. According to the amount of redwood employed the depth of the shade varies. The dye bath must be always prepared with pure water. The interval between the first and second bath must always be of two days. When drying the hats, care must be taken not to expose them to the sunlight, otherwise uneven shades will be the result.

Violet Brown (for 50 Hats).

To a boiling bath add

- 3½ lbs. alum,
- 1½ lbs. tartar,
- 1 lb. muriate of tin,
- 5 ozs. blue vitriol.

Boil for ten minutes, refresh with cold water, place the hats in bath, and boil for one and a half hours. After which lift and leave to cool without rinsing. After twenty-four hours, immerse in a fresh bath prepared with boiling water and

- 10 lbs. Brazil wood,
- 2½ lbs. logwood.

Stir well, and when lukewarm immerse and boil for one hour. For a redder shade add

- 1 lb. alum,
- 1 lb. blue vitriol.

Yellowish Brown (for 50 Hats).

Dye the hats first blue with indigo, then prepare boiling bath, to which add decoction of

- ½ lb. fustic,
- 1 oz. blue vitriol,
- 1 lb. 6 ozs. alum,
- 1 lb. tartar.

Boil eight minutes, immerse the hats, and proceed as with the ordinary brown, by dyeing with madder and galls, and darkening with copperas.—*Deutsche Hutmacher Zeitung.*

New Coloring Matter.

Cauline.—Messrs. Savigny & Collineux have exposed, in an Exhibition of Science as applied to Industry in Paris, samples of cauline (the dye from cabbage) in powder, for solution in the dye bath, and as violet, lilacs, blue and green lakes, and as cauline black for leather dyeing. The two coloring matters *alcine* and *erieine*, have also been exhibited in powder, solution, and in paste; the latter also as dry lakes for calico printers and paper stainers.

The *alcine* can be employed instead of cachou in all its applications. On silk, wool, cotton, and jute, it is said to give brown, salmon, and mouse gray shades, which are especially beautiful on jute; the shades are of great brightness and solidity, resisting chlorine and any amount of washing.

Cauline, which is extracted from red cabbage, is prepared dry or in sirupy extracts. On wool, grayish colors are obtained, vary-

ing from silver grays to dark slate. Grayish and gray lilacs, as well as moss greens, can be obtained by cauline without the aid of any other dyestuff. Every metallic salt gives a different but constant shade with cauline, so that by using different mordants several shades can be obtained by dyeing in the same bath, and this latter can be kept and used for a considerable time. Wool dyed with cauline has great affinity for indigo, and very dark blues can be obtained by first dyeing with it, and then adding carmine of indigo to the bath.

On cotton the mordants used for wool give exactly the same shades when used with cauline, a fact of great importance in dyeing mixed goods. Used alone, it gives on cotton a violet and a peculiar blue shade, called cauline blue. For furniture articles, those of jute especially, it is reported that the three coloring matters have been described will be found of very great advantage either for dyeing or printing. Further, from cauline a black extract can be produced, which dyes leather blue black. Besides these coloring matters, Messrs. Savigny & Collineaux exhibited at the same time a great variety of tasteful patterns dyed with their new products.—*Textile Manufacturer.*

To Dye Straw, etc. *Magenta Red.*

The first operation for dyeing this or any other color on straw, is to steep the latter in a bath acidulated with sulphuric acid for twelve hours. For magenta, take an acid bath of 4° to 5° B. The straw after washing is immersed for 12 hours in a bath kept at 30° to 40° C., containing the necessary amount of dye. Now wash well and dry. Other aniline colors do not dye straw with the same facility.

Maroon, with Logwood.

Clean the straw by boiling with a solution of carbonate of soda, then steep in a bath of logwood for two hours. To give a bluish tint, add some blue stone to the bath; if too much of the latter is used the straw will have a greenish hue. This is a loose color, only employed on account of its cheapness.

Coffee and Chocolate Stains.

If the coffee or chocolate contains milk, the stains produced are more pronounced than if prepared with water only, but they are also more easily removed. To remove them, the stains are washed with a mixture of yolk of egg in tepid water. If with this treatment they still remain, add a little spirit to the mixture, and rub with a hard brush.

Blue Linings for Hats.

In producing these the cloth is not dyed, but the thickened color is applied to it in the following manner: Prepare the color with 22 gallons of water, 30 lbs. starch, 2 lbs. tallow, 44 lbs. ultramarine blue; mix, boil, pass through sieve; print on the roller first on one side, then on the other, and dry on the cylinder.

Pink upon Straw Hats.

The hats are bleached and treated one hour in a bath of 50° R., consisting of 500 gr. common soap to every 500 gr. straw, passed through water and entered in a fresh bath of fuchsine, heated slowly to boiling point. The hats are then left to cool off in the bath, rinsed and brushed.—*Reimann's Faerber Zeitung.*

Dyeing of Loose Wool to Resist Felling.

Translated from the "*Le Teinture Pratique*."

Silver Grey.—For 100 kilos. One hour boiling in a bath made of 2 kilos. nut galls, 500 grammes Campechy logwood, 100 grammes methyl violet, 500 grammes sulphate of iron (copperas).

Ash Grey.—100 kilos. One hour boiling in a bath made of 2 kilos. nut galls, 500 grammes violet, 2 kilos. Campechy logwood, and 1 kilo. copperas. Increase or reduce the quantities for darker or lighter shades.

Greenish Brown.—100 kilos. Boil one hour with 2 kilos. bichromate of potash, 1 kilo. sulphuric acid. Then in a new bath of 10 kilos. redwood, 5 kilos. quercitron, 2 kilos. Campechy logwood. 1 hour boiling and good rinsing.

Dead Leaf.—100 kilos. Boil one hour in a bath of 50 kilos. quercitron, 4 kilos. sulphate of copper, 2 kilos. tartar, 2 kilos. sandal wood, 1 kilo. copperas.

Bright Blue.—50 kilos. Boil one hour with 1 kilo. bichromate of potash, 250 grammes of potash, 250 grammes sulphuric acid, 1 kilo. alum and dye with 124 kilos. Campechy logwood, and a solution of violet. Wash and dry.

Blue Black.—50 kilos. Boil 1½ hour with 1 kilo. bichromate of potash, 500 grammes sulphuric acid, and dye with 20 kilos. Campechy logwood, and 250 grammes sulphate of copper. Wash and dry.

Olive Brown.—50 kilos. Boil one hour with 1 kilo. bichromate of potash, 200 grammes sulphuric acid, and 150 grammes sulphate of copper. Rinse and dye with a fresh bath of 7 kilos. Campechy logwood, 800 grammes solid orange, 4 kilos. archil, 34 kilos. madder.

DRAW in all its many shades will be worn this coming season. The newest shade is called the coachman's drab.

A BEAUTIFUL novelty is a long Japanese scarf, worked in vivid colors with odd designs, and is equally handsome on both sides.

OLD-FASHIONED turkey red calico is shown among the recent importations for combining with the new figured calicoes, which are now given the name of "rouge Adrienne."

WANTS.

Manufacturers desiring help in any department, or persons seeking employment, can have their wants advertised in this column for the low rate of 30 cents per line. No other advertisement will be admissible in this department.

A FOREMAN DYER

In Old England.

ANXIOUS TO COME TO AMERICA.

WANTED.—A situation as Foreman Dyer of Calicoes in all kinds of colors and shades to patterns. 15 years practice in the most famous and largest Black and Dye Works in Old England. Address, with terms, John Hilton, 32 Taylor Street, Tongue, near Middleton, Lancashire, England. Samples of work can be seen at this office.

WANTED.—Situation by a competent Wool, Cotton Warp and Steep Dyer, Stain, etc. Can give good reference. Address, L. E. E., 419 Walnut Street, Room 25, Philadelphia, Pa.

WANTED.—A FEATHER DYER, competent to do all feather work. Address, C. F. Q., 65 Temple Place, Boston.

A QUALIFIED DYER FROM SCOTLAND is open for an engagement as Fancy Glothing Dyer, with a good firm. (Can dye FANT BLACKS, SLATES and DRAKES, as also) ALZARINE REDS, (a new style) Will sell recipe of Black, Stain and Wash, for cotton and silk in all shades. References: S. Haines, Agent, Greenock, S. H. Address, A. McLean, B. L., North Manchester, Ct., P. O. Box, 37.

WANTED A SITUATION by a competent, well-experienced Dyer, who has worked for the firm of J. & D. Patton, the largest Woollen Manufacturers in Scotland of Brevintide and Fancy Tweed, Cheviots; and for four years in the employ of T. J. Salt, Sons & Co., Solihull, Yorkshire, England; and with their eminent firm, having served a seven years apprenticeship in the first dyeing establishment in Paisley, Scotland. Address, J. McK., care of TEXTILE COLORIST, 717 Sanson St., Philadelphia, Pa.

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Vol. 2.

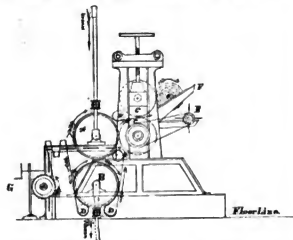
Philadelphia, March, 1880.

No. 15

Silk Finish on Cotton Italian Cloths.

BY W. NATION.

After drying, the goods are taken and damped moderately on the damping machine, they then pass to the chasing calendar, the "set" of which should be so adjusted as to bear with a uniform, medium pressure on all portions of the goods. Here they are chased, the ends being carried round the chasing bars or rollers about four times. This calendaring may be repeated, or the goods may be "beetled" until the required lustre is obtained. After this operation the goods should be of a uniform glossy lustre, though it is probable that the threads will be more or less flattened in places, presenting a watered appearance, owing to the combined action of the water and pressure; this defect may be remedied and the final resultant silk finish obtained by running the goods through a machine constructed as follows; the careful and judicious operation of which largely controls the ultimate success of the finish.



Arrows indicate course of goods. *A, B*, Copper cylinders, 28 inches in diameter, heated by steam, and revolved by the forward movement of the goods; *C, C*, wooden rolls 18 inches diameter, these rolls should make 20 revolutions per minute, and should be covered with felt or machine blanketing; *D, D, D, D*, rigid iron rails, these should be smooth, being for the purpose of guiding the course of the goods; *E*, revolving fan for blowing off superfluous moisture; *F*, Brackets for receiving roll of finished goods; *G*, indicates position of roll of goods previous to going through. The goods being entered at *G*, pass round the first bar *D*, round the cylinder *B*, over the second and third bars *B, D*, round the cylinder *A*, under the last bar *D*, and are delivered in a finished condition at *F*.

The goods should be run with the face side up, and the moisture contained in them should be so regulated that it will make as

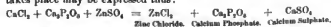
much steam as possible while passing over the hot cylinders, *A, B*, but there should be no more moisture than the said cylinders, assisted by the revolving fan *E*, can evaporate. Should there be any dampness or moist air carried into the finished roll at *F*, it will have a tendency to cause the goods to sweat, which will destroy their elasticity, and otherwise deteriorate the finish both as regards the lustre and feel. We would also say here, that the goods should be held firmly to the hot cylinders, so as to make the contact as close as possible. According to the well known law of hydrostatics, the pressure of steam in a close vessel is exerted equally in all directions, and the tendency of this uniform radial pressure as applied to objects of a cylindrical form is to maintain their perfect circularity, and to restore this form when it is departed from. Therefore should this internal radial pressure be exerted on a vessel whose form is elliptical, it would force it outwards at the extremities of its minor axis until their resistance becomes equal to that of the rest of its circumference, and it assumes the circular form.

The foregoing operations are conducted in accordance with this law, for, the fibres of the cotton, in the condition they would present at the point *G*, may be regarded as hollow tubes of elliptical form, containing more or less water, their ellipticity being rendered more decided by the external pressure exerted by the previous calendaring operations. Therefore, when the goods are brought into intimate contact with the hot steam cylinders, the water contained in the hollow fibres is suddenly converted into steam, and the radial pressure thus brought to bear on the interior circumference of the previously flattened threads forces them to assume the circular form. Not only does this action take place in the interior cells of the fibre, but its effects, which may be compared to a miniature explosion, extend also to the whole organization of the fabric, and the result is that the goods assume a finish which has the appearance of owing its existence to natural causes, and the threads or pattern stand out in that bold relief which we mentioned at the commencement of this article as being one of the remarkable characteristics of silk and wool.

Let us now return to the residual acid solution remaining in the tub *C*, after the gelatin process elaborated in the first part of this article. This solution may be utilized to advantage in the following manner: First, add sufficient chalk to exactly neutralize the free acid; the resultant solution after the reaction which ensues is complete, may be expressed thus:



A solution of zinc sulphate is now made in the tub *D*, and allowed to run slowly, (with constant agitation) into the liquor in the tub *C*, until it ceases to give a precipitate; the reaction which takes place may be expressed thus:



Zinc Chloride. Calcium Phosphate. Calcium Sulphate.

The calcium sulphate being precipitated, and the zinc chloride and

a small proportion of the calcium phosphate remaining in solution.

Now, this zinc chloride is a very valuable adjunct to some classes of size. Most of the so-called crystal size in the market derives its peculiar properties and value from the presence of this compound, its action may be regarded as being both chemical and mechanical, mixed with size it appears to act mechanically in favoring the formation of a more homogeneous mixture, while its well-known antiseptic qualities render it an important factor in the prevention of mildew, and being a remarkably deliquescent salt, its hygroscopic properties contribute to make it a valuable agent in maintaining certain classes of goods, (notably shirtings) in that soft and moist condition which is considered necessary to meet the requirements of the markets.

On Calico Printing.

BY DR. M. HASENCLEVER.

(Continued from page 29.)

After having shortly described the ingredients and apparatus which are necessary for calico printing, we now come to the printing itself. It remains to mention that the cloth which comes from the bleaching department, has in many cases, to go back to the singeing room again. During all the manipulations in bleaching, the cloth is liable to get rough again, and in order to produce a clear print, it must be singed, and then washed again. It is then dried and wound on rollers. The winding has to be done with great care, so that the ends of the cloth form a flat surface. The cloth is for that purpose run over a circular brush which takes off all the loose threads which might have possibly been left on. In order to wind the cloth tight on the roller, it is run over straightening bars and immediately before it reaches the roller, it passes a stretching bar. A boy should be constantly at hand to lead the edges of the cloth carefully.

The color mixture can be applied on the cloth in different ways. In olden times it was done by wooden blocks, and in some establishments this method is used now for some styles of goods. At present the roller printing is most in use, ninety per cent. of the whole calico printing is done by rollers. The machines by which the designs are produced on the fabric consist of different parts, all of which are of importance. We have machines which are arranged for producing from one to twenty, and more colors on the cloth, but seldom more than twelve colors are used.

The principal parts of this printing machine are: first, the cylinder over which the cloth passes and gets printed, and which is turned by steam. In order to get the required elasticity this cylinder is covered several times with cloth; it is called lapping. The cloth is made differently, according to the styles of prints required. The ordinary lapping is made of woolen weft and linen warp, or of several sheets of cotton fixed together by means of India rubber solution. The ends of this cloth have to be fixed carefully in order to produce a perfectly even surface on the cylinder. Of these two kinds of cloth, the latter is not very much used, on account of the changing of the India rubber by pressure and heat.

In course of time these cloths or blankets get soiled at the

edges, notwithstanding all the precautions taken, and they have therefore to be washed and scraped occasionally, especially if used for several color printing. To preserve the blanket as much as possible, a roll of grey cloth is always run under the calico which has to be printed.

The engraved roller is fastened to this cylinder, and by means of screws at each end the roller can be pressed to the cylinder, and the pressure regulated that it may be the same at the whole length. By means of another roller which runs in a color box, the color is transmitted on the engraved roller, which, by being pressed against the cloth on the cylinder, produces the print. To avoid an excess of color on the engraved rollers, two so-called "doctors" are pressed on each side of it. These doctors are generally made of steel plate about $\frac{1}{4}$ inch broad, and of the length of the engraved roller. It is fastened between two iron plates by means of screws. By a mechanical arrangement these doctors are constantly moved right and left while the roller is in motion, thus scraping off all the excess of color.

It depends very much on the careful fitting of the doctors to the roller, if a good and clean print can be obtained. If not carefully employed, the doctors may be the cause of injuring the engraving, and also produce streaks and uneven designs on the cloth. For such colors which might injure the steel doctors, the printer uses composition doctors, which are principally made of brass.

The roller in the color box has also to be covered with blanket cloth, or it is made into a circular brush. The latter is used generally for thin color mixtures and deep engravings.

The mandrel is a shaft of wrought iron or steel which fits in the engraved roller by means of a slot; in order to prevent it to turn inside of the roller, it fits at each end in brass steps connected with the machine. At the end of mandrel a cog wheel is fastened which is turned by the driving wheel of the machine.

In beginning to print the machine is run for a while without the white cloth, in order to see if the print is perfect. The design shows, therefore, first on the grey cloth where it is examined and changes made if necessary. If found correct, the cloth on which the print shall be produced is fastened to a small piece of grey calico which is then brought into the machine between the cylinder and the engraved rollers, thus allowing another short examination before the white cloth gets printed. As soon as this comes between the copper roller and the cylinder, the printer keeps a string ready which connects with the drying cylinders behind the machine. As soon as the white cloth is out far enough, it is torn off from the grey cloth, and attached to the string which leads it over to the drying cylinders. The one-color machine can be run very fast, according to the pattern, it is able to produce up to fifty yards and more in one minute; this, of course, is only possible with very plain designs and very good management.

For more color machines, more skill and practice is necessary, especially in fitting the rollers and keeping them in perfect fit during the whole time of printing. The fitting of patterns means to place the rollers in positions that the various parts of the engraving come exactly on their desired places. This is done by marks at the end of the roller done by the engraver, and these

marks are called pitch points. The printer first arranges the rollers roughly, that the pitch point of one roller comes as near as possible to the pitch point of the following rollers. The pitch points give a mark on the cloth, and it can be pretty easily arranged that the marks of all the rollers come very near to the same place on the cloth. It cannot, of course, be done perfectly at once, and it always requires more or less changing of the rollers. This is done by means of screws at the box wheels, which are fixed at the side of the mandril; by these screws the roller may be turned back and forward as required. In order to allow a change side ways, the places which the mandril lays in, are made moveable, thus allowing the roller to be pushed farther in the machine, or moved backward.

With all the care and attention which the printer pays to the fitting of patterns, he is not allowed to leave the machine for the shortest time, as the slightest unevenness in the blanket, or any other cause, may put the rollers out of their first position, and it requires, therefore, all the attention of the printer, especially for many color designs, to keep the machine in order and thus producing a perfect print.

The calico which has to be printed has to enter the machine in a state of tightness, the roll therefore must run through rails and friction bars.

When everything is in good order the machine is set in motion, each machine having its own steam cylinder, the speed can be very well regulated. The cloth runs between the cylinder and the rollers, thus taking the impression from each roller. It then passes over the whole machine backward to the drying cylinders, but before it reaches them it has to pass a series of rails in order to get dried partially. There are generally three or four drying cylinders attached to each machine. After drying, the cloth is put together and carried away for further treatment.



After printing, the cylinder is lifted up and all the rollers and color boxes taken out. The color is taken out of the boxes and put back into tubs for further use. The wooden rollers in the color box have to be washed carefully and put in order again for immediate use. The rollers are also washed, and if necessary repaired, to make them fit for another print, as for the same pattern the various colors are often changed, thus obtaining several different styles from the same original design.

(To be continued.)

Description of Dyestuffs and Determination of their Commercial Value.

BY H. ENDEMANN, PH. D.

[Copyrighted.]

(Continued from page 29.)

A.—LITHU, ARCHIL OR ORCHIL, CUDBEAR—DYES DERIVED FROM LICHENS.

Like indigo, these dyes are not ready formed in the plants, but are prepared from chromogene substances contained in various lichens by chemical processes. The old processes were or appeared

to be processes of fermentation, but later investigations have proved not only that the fermentation is not a vital part of the process, but only interferes with the process by which the dye is produced to a certain extent, forming inferior products.

The modern processes of preparation of orchil and cudbear are the product of purely scientific research, which amongst, so-called, practical men is as yet credited with least of the achievements of our industry. The beauty of the colors thus obtained has been the cause that ignorant custom-house officials have during the last years frequently suspected that these superior products are entirely artificial colors derived from aniline, or that they consisted at least in part of these dutable colors. No doubt some products are in the market which do not deserve the names under which they are offered to the public, as I shall mention hereafter; since the reactions and properties of some such extracts, prove conclusively that they belong to the aniline colors and are in no way connected with the dyes derived from the various lichens. It is doubtful, however, whether it has ever been attempted to import these into the United States, since none of the so-called suspected samples which have gone through the hands of the writer were proved to have even an admixture of aniline dyes, much less did they consist exclusively of such dyes.

The plants from which these dyes are derived belong: 1st. To the class *Roccella*, of which *Roccella tinctoria* is the main representative, which is also known as *orchilla weed*, or according to the place where it was collected, and from which it was brought as *Angola weed* or *Canary weed*. This lichen grows abundantly on the rocks of many islands in the Mediterranean and in Italy, but most of it comes at present from the Canary and Cape Verde Islands, from Madagascar, Zanzibar and a number of South American ports.

They differ somewhat in outer appearance, yet the general habitus of the plant is always recognizable, which is a very short, round stem at the basis of but few millimeters diameter, from which spring many branches, flat or round, which sub-divide like the branches of a tree, each branch ending in a fine point. The color is a greyish or brownish white. The value of these lichens varies considerably, but it is not difficult to approximately determine it by a few chemical tests, as we will show hereafter.

2d. To the class *Varolaria*, which are found on Alpine rocks in the Pyrenees "*Varolaria dealbata*," in the Auvergne "*Varolaria arcina*," and in Sweden "*Lecanora tartarea*," the tartarean moss. These lichens differ greatly in shape from the *Roccella* species; they form white crusts of very irregular shape on the rocks.

The use and preparation of dyes from these plants dates back 500 years, when the first and oldest process, which with few alterations was continued to the present century, was invented for the production of a dye from lichens growing in Asia Minor and the neighboring islands.

This old method as described by Coeq at the commencement of the present century, consists in the following:

The collected lichens are first dried to prevent fermentation, then sifted to remove stones. 200 lbs. of the lichens thus pre-

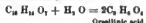
pared are then brought into a tank 7 feet long and 2½ inches deep, slightly wider at the top, which is furnished with a cover by which it may be tightly closed. About 60 gallons of putrid urine are then added and the whole well stirred from three to five hours for two days and nights. Then 10 lbs. of dry slackened and sifted lime, ½ lb. of powdered white arsenic, and ½ lb. of alum are added. A fermentation sets in, and after adding, 2 days later, two more pounds of slackened lime the mass is left to itself for several weeks, stirring it but rarely. In about four weeks the color is generally completely developed, and the mass is then kept in its moist state (orchil or archil). It is stated that the color will thus yet improve for some time, but after the lapse of two years a change in the opposite direction becomes visible. After the color has been fully developed the mass is therefore often dried and ground. This preparation is known by the name of cudbear.

One of the first improvements introduced in the manufacture of these substances was the application of ammonia in the place of urine and lime, or the use of ammonia salts with the addition of lime. Thus the manufacture of these dyes lost much of its offensiveness.

Before now, however, the description of the latest improvements introduced in the manufacture of these dyes can be given, it will be necessary to first consider the chemistry of the process by which these substances are produced from the colorless substances found in the plants.

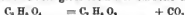
All those lichens, which may be used for the manufacture of archil dyes, contain certain acids, which as a product of decomposition will yield a substance called orsellinic acid, which by further treatment will yield orcin. Orcin under the combined action of ammonia and air will yield then orcein, which is the main dye in orchil and cudbear.

The following formulae will represent the changes which these acids undergo, taking as starting point the lecanoric acid derived from *Secanora tinctoria*. Lecanoric acid ($C_{12}H_{14}O_7$) under the influence of boiling water or alcohol is converted by the assimilation of water (H_2O) into orsellinic acid:



Continued boiling produces then orcin and carbonic acid which passes off.

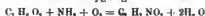
Orsellinic acid gives orcin and carbonic acid:



Orcin may also be produced directly from lecanoric acid by subjecting it to the process of destructive distillation. No doubt the same result is likewise produced at a lower temperature if sufficient time is allowed for it.

The orcin thus produced is then converted into orcein by the simultaneous action of ammonia and air, or rather the oxygen in the air.

Orcin and ammonia and oxygen give orcein and water:



If we allow orcin, ammonia and oxygen to act upon each other in the presence of the carbonate of one of the fixed alkalis, the blue coloring matter of litmus is produced. If a lichen does

not contain lecanoric acid but erythric or evernic acid, or other acid which will give orcein as the product of decomposition, the reaction is similar and the result the same.

From the above it is evident, that fermentation has in fact no part in the production of the dye. The improved methods mentioned above are therefore carried out without fermentation, and following closely the method outlined in the above scientific explanation.

(To be continued.)

New Coloring Matters.

CAULINE, ALNEINE, ERICINE.

At the Paris Permanent Industrial Exposition, there were new coloring matters and goods dyed with the same, which attracted some attention from the tinctorial trades. The peculiarity of these new extracts, is that they are derived from common vegetables, such as cabbages, briars, alder, etc., heretofore unknown as coloring recipients, of practical value in dyeing. We summarize the remarks and notices published on the subject. *Cauline* is extracted from the red cabbage, *Brassica caulis*. Under the action of acids it turns red and emerald green, then yellow under the influence of alkalis. It is applicable to textile goods and to printed paper. On wool it furnishes all the grey series, from silver grey up to grey-lilac. Also, the green moss and *Carmelite* shades. These varieties are obtained by certain salts adequate to the color wanted. It is claimed that through this change of salts the same bath of cauline can produce various shades successively. Up to seven colors, from slate to dark olive, have been produced consecutively from the same bath, which ordinarily requires seven different kiers. We have the seven samples from the goods claimed as having been dyed by that cauline process. It is also reported that a small dose of carmine, indigo or sulpho-indigotic acid in cauline, produces very good deep blues on any textile, whether vegetable or animal, and on mixed goods, such as wool and cotton, silk and ramie, in a single operation.

The precipitates or residues from the cauline dye bath are used for printing calicos or paper-hangings, having none of the arsenical mordants used in some other coloring ingredients.

Alneine is extracted from the Alnus plant and other shrubs of the same family. It has chemically a great similarity to the Cachou. On cotton, wool, silk, etc., it produces deep drab, buff, and darker shades. It principally succeeds on kid for Suede gloves. This dye is claimed as very energetic and fast; chloride cannot remove it; cotton velvet is perfectly dyed by it, according to the report. We also have received samples of goods dyed with alneine.

Ericine is an extract from common briars (erices), very abundant everywhere in France. It produces clear yellows, orange yellow, old gold yellows, Spain-tobacco shades, etc. This chromatic scale of colors can generate the green bronze, green mignonette, etc. It dyes readily cotton, wool, silks, phormium, etc. Ericine is destined, they say, to supersede the coloring matters of imported bark. Samples of goods represented as being dyed with this coloring, especially some ramie and cotton, seem to justify the claims based on ericine as being a fair yellow generator. But as these three new products have been applied on a limited scale and in a circum-

scribed sphere, we merely mention them as new comers in the tinctorial family, which must be examined and tested before adoption. The important feature we remark in these novelties is, that the French chemistry is endeavoring to find in the natural forestry resources of France the means of suppressing the onerous importation of foreign dyestuffs, a task worthy of our imitation.

On the Various Azo Colors now Sold in Commerce.

BY JAMES STEPHENS, JR.

(Continued from page 51.)

If on the other hand, the solution is cooled rapidly, long and brilliant blood red needles, or prisms, are obtained, which group themselves fan shaped together. The faster the solution is cooled the smaller are the crystals, and if cooled very rapidly with an ice mixture the whole liquid will turn red, and take a pasty consistency, which if examined under the microscope, is found to consist of fine microscopical needles. These properties can be equally well observed in chrysoidine hydrochlorate, nitrate, sulphate and oxalate, while the acetate is an uncrystallisable syrup with beetle green luster, and soluble in water in all proportions.

Chrysoidine hydrochlorate, forms fine crystalline double salts with metallic chlorides; as for instance, the zinc double salt, which is obtained by treating an aqueous solution of chrysoidine hydrochlorate with an aqueous solution of zinc chloride. This is quite soluble in water, but insoluble in a solution of zinc chloride.

On account of the instability of the double acid salts, it was thought wise to substitute the hydrogen in both amido groups by organic radicals, as a proof that chrysoidine actually contains 2 (NH₂) groups. For this purpose the following tests were made:

Dimethyl chrysoidine.—The iodide of this substance is produced by the action of methyl iodide (CH₃I) on chrysoidine, under the influence of a gentle heat. The free base crystallizes out of an aqueous solution of alcohol indistinctly.

Benzoyl chrysoidine is produced by the action of benzyl chloride on chrysoidine, at a temperature of 100° C.

Tetramethyl chrysoidine is formed at the ordinary temperature, by the action of diosobenzol salts on tetramethylphenylen diamine. The body thus produced does not crystallize. All these substances dye silk and wool of a fine yellow color, and are the redder, the higher the molecular weight.

Diacetyl chrysoidine.—This is obtained by treating pure chrysoidine base, with an excess of acetic anhydride. The mass thus obtained, is boiled with alcohol and crystallized out of boiling glacial acetic acid, without by-products, in the form of orange yellow, brilliant, short and star grouped needles, which on some planes, have a slight blue dichroism.

The substance thus formed, when perfectly pure, melts at 250°5', and gave by analysis, the following figures:

CALCULATED.	FOUND.	
C—64.88%	65.00;	64.88; 64.40%
H—5.40%	5.87;	6.10; 6.01%
N—18.91%	—	—
O—10.81%	—	—

100.00%

From these figures the following formulæ was deduced, viz:



Mild reducing agents, as zinc dust and acetic acid, lead to the formation of hydrazo bodies. Light yellow solutions are thus obtained, which are very greedy for the oxygen of the air, and partly rebuild the original compound, chrysoidine. On the other hand, violent reducing agents, as tin and hydrochloric acid, lead at last to the splitting up of the azo group. The solution thus obtained, is freed from tin by means of sulphuretted hydrogen, is heated to boiling in order to drive off the gas, and is then made slightly alkaline. It is then submitted to fractional distillation; and collecting the oil that passes over, nearly the theoretical amount of aniline is thus obtained, which was recognized by its boiling point and other reactions. The mass still left in the retort showed the following reactions: 1. It turned brown in the air, taking up oxygen freely, and precipitating a new basic body soluble in acids, with a red brown color. 2. The acidified solution on the addition of some oxidizing agent, (as ferric chloride, bichromate of potash, etc.) turned red, and yielded the same basic coloring matter as mentioned under No. 1.

It has been found by experiments, that phenyldiamine would not produce the above reactions, but a solution of triamido benzol, (produced by the reduction of dinitro aniline, obtained by the nitration of acetanilid,) showed exactly the same phenomena. Therefore, as the 3 amido groups, (NH₂)₃, of the triamido benzol thus produced, are in the positions 1: 2: 4, it is only natural that the relation of the amido groups, to the azo group in chrysoidine, should be in the position 1: 2: 4. By the reduction of diacetyl chrysoidine, the two acetyl groups are split off, and the same products are obtained as mentioned under the reduction of chrysoidine.

DRY DISTILLATION.

If chrysoidine acetate be heated in a retort from 150° to 175° C., or chrysoidine hydrochlorate to 200° C., the mass will melt, blacken and swells up; at the same time an oil distils over, which was found to be aniline in all cases. By treating the charred mass left in the retort with an acid solution of alcohol, a violet red dye can be extracted. This dye seemed to be identical with chrysoidine induline, and is formed by the action of aniline on an undecomposed chrysoidine salt.

SPLITTING UP BY ADDING WATER.

If chrysoidine is heated in sealed tubes to about 150° to 160°, with dilute hydrochloric acid for some time, a complete splitting up of the molecule takes place. In opening the tube, nitrogen is evolved. The contents of the tube is colored black. This, if distilled with a large amount of water, drives phenol over, and may be recognized by its reaction with chloride of lime.

The contents of the retort consist of a red brown solution which seems to be identical with the color obtained, as above mentioned, by the oxidation of triamido benzol. After this dye has been precipitated with alkalis, ammonia may still be found in the mother liquor. This coloring matter has not been studied any further, but we may assume that on account of the ease with which it is formed, it may be expressed by some simple formula.

THE ACTION OF AMIDES.

Chrysoidine, (as nearly all amido azo compounds,) when brought to react on aromatic amines, forms new dyes, which belong to the numerous induline group, (indulines are dyes produced by the action of aromatic amines, on the hydrochlorate of some amido azo compound). The only product thus far obtained from chrysoidine, is a dirty violet dye, produced by the action of aniline on chrysoidine hydrochlorate; but it possesses all the characters of the indulines and the compound before described.

(To be continued.)

On Ostrich Feather Dyeing.

BY PAUL ALEX., PRACTICAL FEATHER DYER.
(Continued from page 31.)

I have often been asked how I produced such a brilliant color on my goods in such a short space of time? I will tell you it is because I never save up my old baths until they have become moulded and rusty; but, for every separate color, I mix new baths. You will say that is extravagance, but I prefer to be called extravagant and turn out fifty or sixty rich, brilliant colors in a day than be careful or miserly, and turn out ten to twelve colors that look, when finished, as if they had been hung up in a smoke house to dry. I will now give the reader an idea of how I proceed to make four or five dark colors in a short space of time:

Supposing the colors to be seal brown, bottle green, navy blue, or plum, I prepare my feathers for the bath by washing, if required; I have here four dark colors to be done in half an hour; I have four basins or bowls, a boiler of boiling water; the aniline green is put in a basin, likewise the blue; the dye to use his own judgment as to the amount. Boiling water is poured over both, and feathers entered—now the plum and brown. Put on a bath of logwood chips, and boil ten or fifteen minutes, give for the brown a bath of tumeric for a few moments; then enter in the logwood; also those for plum at the same time. Let remain a few minutes, take out and give a bath of bichromate of potash, then mix your bath of brown and plum, which requires about two minutes time; let remain a few moments; take out and rinse. Now take the four colors and put all together in a bath of logwood for a few moments. Take out and rinse. Give a bath of bichromate of potash, rinse, and you have your four colors. If you want them darker, repeat the last two baths, until you have obtained your shade. These four colors can be easily made in thirty minutes, to match any sample, dark or light.

You don't believe it? Well, I speak from experience, and can prove what I say in the art of dyeing. I am sorry to say there is too much of any spiritualism would call "orthodoxy;" I mean too much confidence put in the old-time method of dyeing; but it don't pay in this advanced age. There are about four good feather dyers in New York; outside of them we have no artists in America for making a cardinal scarlet or garnet. You will find it good to dry up your feathers when about half done; and when thoroughly dry, return to bath, after adding a little more color, if necessary.

In next month's issue I will give to the reader the names of all the dye stuffs used by me, and compare some of the old recipes with those of to-day.

(To be continued.)

Jute Yarn Bleaching.

As we bleach flax and hemp, yarn so we can jute yarn also. Yet it is unfortunately the case, that in endeavoring to secure a

good white, equal to those other yarns,—which is undoubtedly due to perfection,—we find that the clearness and beauty of the color soon deteriorates, and that the yarn itself loses its strength as well as its purity of tint. From the experience derived from frequent trials, we are forced to conclude chloride of lime or chlorizone is the only really safe bleaching medium, and even that must be used with very great care, taking it and hanging it in hanks upon rods, and turning it for thirty to fifty minutes in a lukewarm weak solution of chloride of lime. By using a special apparatus constructed for the purpose, it is easy to perform the operation satisfactorily. The inventive genius of our country will soon present such an apparatus to the bleacher as will completely overcome all difficulties and uncertainties. At present several kiers are necessary; these may be heated. The rods for hanging the jute yarn must be of such material as is proof against injury from the chlorine, and they must be made to turn so as to ensure the submersion of the yarn during the process. A method of rapid transfer from one kier to another is highly necessary; it thus receives for, say ten minutes, a tepid soap bath, which having dripped off, it may be placed in a solution of chloride of lime of 10035 sq. gr. and be again passed through soap and water, followed by chloride of lime; so proceeding until the required shade is obtained. Finally, the jute yarn is to be washed in tepid water first, then in cold, wrung out and dried in the open air. Thus the bleaching is completed, securing a good cream color, without at all weakening the strength of the yarn. Such an end could not be attained by boiling in soda, as that would have the effect of turning it a brownish shade, whilst to use diluted acids with it would be most detrimental, so that all these had to be abandoned and the chloride of lime used in their stead. It is not improbable that chemical research may yet produce an agent capable of giving to jute yarn a desirable whiteness, without the bad effects which are now to be dreaded under the usual mode of bleaching flax and hemp.

Turkey Red.

Since 1867, the manufacture of turkey red has been somewhat modified by the use of artificial alizarine. From all appearance the old process will be gradually superseded by less complicated methods. By the ordinary procedure the scoured pieces are subjected several times in rotating oil baths, and in carbonate alkaline solutions, or in simple oil emulsion. Afterwards they are exposed on the lawn, or in a heating apparatus, until the oil is completely modified. They are then scoured in an alkaline wash, then subjected to alumina mordant. Another method consists in passing the pieces through a decoction of nut-galls, then dried, and submitted to baths of acetate of alumina, aluminate of soda, or sub-sulphate of alumina. Sometimes they are subjected to chalk and other materials, according to the mordants used. The tinctorial bath is generally made with madder, sumac, chalk and soap. After the dyeing, the material is washed and vivified in a closed boiler with carbonate alkali, then soap and pooter salt. All these operations are too long and difficult.

The artificial alizarine had sensibly modified this method several years ago, so that the new article was discovered and ap-

plied on turkey red. In 1875 a Glasgow concern employed daily over 3,000 pounds of alizarine for the ordinary turkey red. For a couple of years new fat mordants have been introduced with great success; they are sulpholeate alkalines in combination with other substances. After emulsion in these oily materials, the pieces are dried and subjected to acetate of alumina, then dyed by artificial alizarine, excluding the use of blood, and shortening other operations. The result of the operation depends upon the preparation of the oil mordant. M. Muller Jacobs gives on the subject the following detail:

"The castor oil is treated with 20 per cent. sulphuric acid, 66° B. poured, gradually, cold in the oil. After a sufficient contact, the neutralization of the acid is effected by crystals of soda. This oil mixes easily with water. Olive, arachis, and colza oils also give good sulpholeates, but the yield is inferior to that of castor oil."

M. Muller prepares a second substance in treating hot, 100 parts of rosin with 250 parts of nitric acid, evaporating and heating the residue for a half hour at 250 or 280° in a closed pan. After cooling, the substance is treated with 10 or 20 per cent. sulphuric acid, at 66° B. and neutralized with soda. This forms the "sulphuricbenthinate" of soda. This salt, separated from the sulphate of soda it contains, is mixed in equal parts with the sulphuricinate of soda above mentioned, and is, according to M. Muller, the oily mordant used for turkey red manufacture. M. Haussman was the first who recognized the necessity of adding chalk (calcium) to the bath. M. Schlumberger has determined its usefulness by showing that it is fixed in the dye, like the coloring matter. M. Schutzenberger has noticed that in the red madder vivified, alumina as well as calcium, acts in a definite manner. M. Rosenthal has found that alizarine, diluted by distilled water, does not saturate the mordant. This proves that those results are most successful with a carbonated lime to a certain extent; that is to say, until the quantity of calcium (lime) corresponds with the formation of a monoclinic lac. Above that quantity it is injurious, as it forms a calcareous carbonate. Bi-chromate of calcium has been substituted for chalk, but not with satisfactory results, on account of its slow solubility.—*Tinturier Pratique*.

Ammonia.

For several years past there has been a large increase of demand not only for ammonium sulphate but for caustic ammonia, growing out of the extended use of Carre's ice machines, the advance in refined chemical manufactures, as of organic dyestuffs, etc., and lately the introduction of the ammonia process for soda manufacture.

The staple, almost the only material used for obtaining ammonia, is still gas liquor, and the method of treating it has not recently undergone any very great change. Direct saturation of the liquor by an acid was long since given up, and distillation of the crude liquor, to which lime is added, usually by means of high-pressure steam, with or without the aid of air blown through the liquid, is practically always resorted to, the ammonia driven out being con-

densed in acid contained in a separate vessel, and for the most part so manufactured into sulphate; while for the production of caustic ammonia the gas, derived either from decomposition of a previously prepared ammoniacal salt, or directly from the crude ammoniacal liquor, is carried into water in condensers presenting adequate surface. There have been a number of improvements in the details of the distilling and condensing apparatus, of which the most noteworthy involve the principle of so-called dephlegmation. A good example may be found in Solvay's recently invented form of apparatus for concentrating the ammoniacal liquor of the gas works.

Dr. Frank has not long since suggested the desirability of saving both the ammonia and the tar, which are at present lost upon a very large scale in the working of coke ovens; but, while admitting the magnitude of the loss now suffered, and the importance of finding means of preventing it, the fact should not be overlooked that in all the processes of destructive distillation carried out on the large scale, it has been found very difficult to secure the best results at the same time as to the fixed and the volatile products, preserving meanwhile reasonable economy as to the form of apparatus, simplicity in the method, and amount of labor and time consumed.

The great problem of making ammonia synthetically from atmospheric nitrogen remains apparently as far as ever from an industrially available solution, but numerous attempts at such continue to appear in the form of an annually increasing number of patents.—*Manufacturers' Chronicle*.

Application of Chemistry to Textile Art and Dyeing.

(Continued from page 40.)

It has been proposed to use the bisulphide of soda in conjunction with an acid to prepare the sulphurous acid solution. Sodium bisulphite, (bisulphite of soda) and hydrochloric acid yield sodium chloride and sulphurous acid.



The varying and inconsistent composition of the sulphite, and the increased expense would be the objections to this process. Chloric and nitric acids which have been previously considered, contained only one atom of hydrogen which could be replaced by a metal; they are called *monobasic acids*. In sulphurous acid we meet the first example of the class of dibasic acids which contain two atoms of hydrogen that may be replaced by metals. These acids are distinguished by their capability of forming two series of salts. If we replace one atom of hydrogen in sulphurous acid by a metal, say by sodium, we form bisulphite, (bisulphite of soda), Na H SO_3 . Salts of this class are called *acid salts*, because in them the affinity of the acid which they contain, for the metals is only partially satisfied.

If we replace both atoms of hydrogen by sodium, we obtain sodium sulphite, (sulphite of soda), $\text{Na}_2 \text{SO}_3$, a *neutral salt*.

The neutral salts of sulphurous acid are called *sulphites*, and they are generally prepared by passing a current of sulphur dioxide gas through water which holds the oxides or carbonates of the

corresponding metals in solution or suspension. They are not very stable, and in the presence of moisture are decomposed in contact with the air, sulphates being formed. Sodium sulphite, (sulphite of soda) is used in the arts as an *antichlor* to neutralize the traces of chlorine which fabrics retain after bleaching, and which, unless removed, would prove very injurious.

SULPHUR TRIOXIDE SO_2 AND SULPHURIC ACID H_2SO_4

If a mixture of sulphur dioxide and oxygen is passed through a heated tube containing finely divided platinum, the two gases combine and form sulphur trioxide, which condenses to white silky needles. This substance possesses no acid properties, it combines with water with remarkable avidity, hissing like a red hot iron when it is dropped into it. It does not merely dissolve in the water; it forms with it a new compound according to the formula:



Sulphuric acid is also formed by the oxidation of sulphur by concentrated nitric acid; or by exposing a solution of sulphuric acid to the air, or to the action of nitric acid.

Sulphur dioxide, SO_2 , is generated on a large scale by burning sulphur, or roasting iron pyrites (iron sulphide) in suitably constructed furnaces. The fumes pass through a flue into a series of huge leaden chambers. They are mixed with nitrous fumes, generally before they enter the chambers—sometimes when they have passed into them. The latter are supplied with steam by means of jets suitably disposed through the chambers.

Thus all the conditions for the formation of sulphuric acid are complied with, and sulphurous acid gas, oxygen from the nitrous fumes, water and heat, are supplied. There have been set forth quite a number of theories of the exact nature of the reaction that takes place in the chambers—most of which assume that the oxygen is furnished, in the first instance, by the higher oxides of nitrogen, contained in the nitrous fumes; these are thus reduced to a lower oxide, which takes up oxygen from the air in the chamber, and is reconverted into a more oxidized compound, which in its turn supplies oxygen to the sulphurous acid; and that this process goes on continuously.

This explains the fact that a comparatively small quantity of nitrous fumes is capable of producing a very large amount of sulphuric acid. This sulphuric acid drops to the bottom of the chamber in which it is formed, from whence it is drawn off by a leaden syphon when it attains a specific gravity of 1.6. A single chamber, however, does not suffice to convert all the sulphurous into sulphuric acid; the gases therefore, pass through a series of chambers, and, before reaching the chimney, through a tower where they encounter a jet of steam, which condenses the rest of the acid vapors which they still contain.

(To be continued.)

New Process to Produce Chinchilla.

The process of chine or chinchilla production by dying, has so far consisted in tying the slubbing from place to place, or to print it by costly plates and manipulations. All this is superseded in

France by a new method, consisting in subjecting the slubbing under frames of wires so disposed as to compress and protect the textile at the spot desired. For example, if two frames of a given size and netted with wires as a screen, are screwed with slubbing equally placed between them, and said frames placed in a drying bath, the dye will penetrate the fibre where unprotected, and not touch the parts confined under each wire of the screen, which can be made of any printing size. This sort of negative and positive system introduced into the art of dyeing, has been patented in France by the inventor M. Bentayoux, and a Company formed for the carrying out of the process, which works under the name of *La Société en participation du chinage par la teinture*.

This system has been extended to yarns of any fibre, as well as to silvers, and has been improved in its operation. Instead of dipping or immersing the frames containing the fibre, they are injected first with mordants, and afterwards with the dye circulating through, under a certain pressure from a pump or any other means of expulsion. The whole details of the process have been specified in the French patent, but this is the clear substance of the *modus operandi*.

New Dyeing Process.

(From *Le Jacquard*.)

Messrs. Schubzemberger & Naudin have contrived a new chemical combination to make aniline colors fast. They speak of it as follows in the brief of their patent claims:

"We have observed that certain colors applied on textiles do not change nor return when they have been re-oxidized under favorable conditions. For instance, if the oxide is applied with an aniline salt on the fibre, a deep bronze can be obtained. This color or shade being reduced or discolored by a reducing bath of hydrosulphite of soda or of stannite alkaline, then oxidized by air, by chromate, or by a solution of perchlorine of iron, there comes out a blue more or less deep, imitating indigo and resisting the action of air, light, or of washing.

"We therefore claim a special reserve on the general procedure of obtaining the shades, or modification of shades, as aforesaid, through this method of oxidization, for dyeing or printing, especially for blue imitating indigo, after reduction by any hydrosulphites, and other colors derived from oxidized aniline re-oxidized, as specified, etc."

NITRO-ALIZARINE.—M. Strobel, chemist, has obtained by the nitrification of Alizarine on the tissue, a very bright orange color. But as this mode of application is injurious to the goods, another chemist has succeeded in securing the same result by a compound called nitro-alizarine, which can be used as aniline colors, by the ordinary method, in using mordants, such as alumina, acetate of chrome, etc.

REDUCIBLE BLUE-BLACK.—The high price of indigo has induced many attempts to find a cheaper blue. M. Ch. Collin has patented in France a new blue-black coloring matter, which is claimed as a cheap substitute for indigo-black, which costs more than this new agent, and of which also, a larger quantity is required for the same result.

TEXTILE COLORIST.

Dr. M. FRANK, Manager.

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It is evident to every one who gives any consideration to the subject, that taste and discrimination are growing and extending. The knowledge of the aniline has mainly contributed to this state of things, and the remarkable subdivision of colors, and tints of color, shows clearly that investigation and invention are on the path of improvement. Nicety of taste is cultivated to a high degree, through the influence of this graduation of diversified colors, into interminable shades of tints, and with the well-studied aid of chemical science we find ourselves at this day in the possession of knowledge by which the dyers enter into honorable competition with each other, and whoever wins in the æsthetic contest, the public is sure to derive benefit from the necessary investigations. It is said, and probably with truth, that in the earlier ages of the world colors were in use which are now lost to us. If this be so, we on the other hand, have ample cause to flatterate ourselves on the possession and progressive acquirement of colors and tints of which the ancients never dreamed. And it is not at all improbable that we may yet recover the lost knowledge of those very colors which shine so lustreously in the imagination of those who take immeasurable delight in peering into the past, even to the dim beginning, and reporting the wonders inaccessible to us, even in the plenitude of our educated day. But, let our dyers but study, experiment and investigate, and all that is worth having is sure to be acquired.

FASHION.—Meditating on this, to many most interesting of all subjects, we found in a recent number of *Les Temps*, ideas which so completely coincide with ours that we take the liberty of using them, together with our own observations.

Taste and fashion are alike inconstant, and so, to be a popular manufacturer of what is novel, a flexible spirit is required in order to assimilate the modern currents of fancy, which constitute "fashion." Old "routine" is dead, the producer who sticks to it is inevitably doomed.

The causes generating new shapes and styles, called *la mode* are not the feat of one individual, nor the result of accident. There is in it a philosophy compounded from many ideas and efforts. Like artistic creations, it has been subjected to many changes, modifications, and new manipulations before reaching the acceptable form which pleases sufficiently to be elevated to the dignity of Fashion. Nothing is spontaneous nor capricious in it, as is supposed. Many and many attempts fail for one which succeeds; and this successful one has to be sifted and tested severely with corrections, perfections, and final trials before being tacitly accepted by the electric current of the collective taste. The frivolity of fashion is only apparent; it is the artistic fancy adorning a solid motive, based on a temporary necessity or utility. Observed closely, in their relative bearings, the new colors or combination of shades in favor, or the spinning and weaving style of a fabric, always represent some timely requirements. Even a simple change is sometimes valuable as a desired departure from a monotonous, tiresome, and often nauseous old thing, worn out in taste if not in material. Such is progress under the influence of our restless nature and fanciful minds.

WE SEE by some remarks in the *Chemical Review*, that although England is the native country of the coal-tar colors, Germany distances in the manufacture, England, France and Switzerland put together. The two latter countries producing equal amounts, being each inferior to England in production. Germany, it appears, exports four-fifths of its product. Why this preponderance on the side of Germany, and short-coming on England's side, can only be accounted for by the fact that textile colors are produced from a soft coal, which is found in abundance in Germany and largely exported to England. Thus we find that the invention of one country is profitably carried out by another, owing to natural advantages.

THERE SEEMS to BE a great desire on the part of European textile communities to forward the movement in favor of technical education, and here in America a slight effort has made itself evident; inasmuch as some of the industries are taught, and those relating to the textile interests have not yet come under consideration, apparently. It appears to us that the teaching of textile dyeing calls for the special patronage of the master dyers themselves, inasmuch as it is their exclusive interest to have those who work for them as intelligent and practical as possible. We have already touched the subject, but desire still to repeat the effort to arouse our textile dyers to action in this matter.

What we propose is a school for dyeing, in which every facility for obtaining thorough instruction in the theory and practice of that art shall be given. A rudimentary course of chemistry to accompany the manipulation lessons. A library well supplied with valuable books of reference on the subjects of dyeing, bleaching, printing, etc.

Is such a school for the education of those who desire to make the art of dyeing their pursuit in life, surely the employers and manufacturers are deeply interested. It is by them, then, the effort is to be made to establish it.

DYEING DEPARTMENT.

THE MONTH'S PRACTICAL RECIPES.

The following practical recipes, like all that will appear in this department, are verified as reliable and warranted to come out satisfactorily, provided the proportions are strictly adhered to, and the manipulation be workmanlike.

DIRECTIONS, NOTES AND COMMENTS.

Ques. We have frequently been asked why we give the names of the makers of the aniline and dye stuffs we use when publishing the recipes accompanying our inserts. The reason is: We can speak with authority for those we actually test; where, anilines and dyestuffs of the same color, manufactured by other firms, may be equally good, but when treated according to our recipe, may not give similar results. In giving the names of certain manufacturers, therefore we would not be thought partial to them. Each has his own mode of producing desired effects with his own dye stuffs.

Recipe No. 48.

GEN'DARME BLUE ON SLUBBING.

50 lbs. Slubbing.

Dissolve 2 ozs. Borax,

7 ozs. Blue W. G. { Badische Aniline and Soda Fabrik,
Pickhardt & Kuttroff, N. Y., Boston & Phila.

Enter Slubbing at boiling point; turn until even; raise and pour off in same liquor with 2 ozs. Sulphuric Acid; wash.

Note.—This shade stands a light scouring.

Recipe No. 49.

CREAM COLOR ON SLUBBING.

50 lbs. Slubbing.

Boil 5 lbs. Glaubersalt,

1 lb. Sulphuric Acid,

¼ oz. Aniline Yellow,

¼ oz. Orange.

Enter Slubbing at boiling point, and turn to shade.

Note.—This shade will stand fulling.

Recipe No. 50.

FAST GREEN ON SLUBBING.

50 lbs. Slubbing.

Enter boiling, and turn for 4 hour in the following mordant:

4 lbs. Sulphate of Alumina,

1 lb. Bichromate of Potash,

4 ozs. Tin Crystals,

4 ozs. Sulphuric Acid.

Wash well and finish in:

2d Bath—4 lb. Sulphate of Alumina,

2 lbs. Glaubersalt,

12 lbs. Indigo Paste,

¼ lb. Fustic Extract.

Enter boiling, and turn for about 2 hours.

Note.—Should a darker shade be required, a bucket or 4 lbs. of Log-wood chips can be added to the 2d bath, at the same time adding ¼ lb. Blue Vitriol.

Recipe No. 51.

SCARLET OMBRE ON WORSTED.

50 lbs. Yarn.

Enter Yarn at 160° F.

1st Shade, 5 lbs. Glaubersalt,

1 lb. Alum,

1 lb. Sulphuric Acid,

2d Shade, 4 oz. Ponceau, {
3d Shade, 1 ½ oz. Ponceau, { R R R { Actien Gesellschaft, Berlin.
4th Shade, 4 ozs. Ponceau, { Henry A. Goeld, Boston, N. Y. and Philada.

5th Shade, 2 ozs. Orange,

2 ozs. Grenadine.

6th Shade, 1 lb. Indigo Carmine.

For more explicit manipulation, see Recipe 61, Vol. I, 1879.

Recipe No. 52.

LIGHT BLUE ON COTTON.

50 lbs. Bleached Cotton.

Dissolve 3 lbs. Alum,

3 ozs. Tartaric Acid,

4 oz. Water Blue, 6 B. { Actien Gesellschaft, Berlin.

Enter Yarn at 110° F., turn rapidly, raise temperature to 130° F.

and turn to shade.

Note.—It is advisable to add first 4 oz. of Blue and balance after the cotton is perfectly even.

Recipe No. 53.

SCARLET ON WORSTED.

100 lbs. Yarn.

Boil 10 lbs. Glaubersalt,

14 ozs. Azobenzole Fast Crim- { Badische Aniline and Soda Fabrik.

son 2 R. Pat. { Wm. Pickhardt & Kuttroff,

2 lbs. Sulphuric Acid, { New York, Boston & Phila.

Cool down to 160° F., enter quick, turn rapidly while raising temperature to boiling.

☐ This is a new and valuable product as substitute for Cochineal.

Recipe No. 54.

FAST BLUE ON WOOLEN YARN.

75 lbs. Yarn.

Dissolve 14 lb. Sal Soda,

8 ozs. Fast Blue, { Fred. Bayer & Co., Barmen.

{ E. Seiblich & Co., New York,

{ Boston and Philada.

Enter yarn at 180° F., and turn until the desired shade is reached, wash and finish in 2d bath at 150° F., with 1 pint sulphuric acid. Give 4 turns and wash.

Note.—This blue can be dyed with sal soda alone, but the sulphuric acid seems to brighten the color.

Recipe No. 55.

SCARLET ON COTTON.

50 lbs. Cotton.

Lay down over night in 12 lbs. Sumac, wring.

2nd bath 14 lb. Tartar Emetic. Give 4 turns, and let it remain for 4 hour, turning occasionally, wash, wring, and enter.

3rd bath, 5 ozs. Saffranine A. { Bindschedler & Bush, Basel.

2 ozs. Phosphino Prima. { A. Kilpestein, N. Y. & Philada.

At 110° F., turn until even, and towards the end of the operation add 1 lb. tin crystals to set the color.

Note.—After the dye bath is exhausted, the tin crystals are to be added, which will make the color considerably faster. If crystals are used before the dye bath is exhausted, the shade will be uneven and will rub.

(Continued on page 61.)

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PRICES CURRENT.

PHILADELPHIA, MARCH, 1880.

DYES AND DYE STUFFS.

	lb.	\$	¢	¢	¢
Acetic Acid.....	1	30	6	5	8
Albumen, Ground.....	1	85	95		
Albumen, Egg.....	1	21	02		
Alum, blue.....	1	21	24		
Alum, lump.....	1	30	10		
Annatto, prime.....	1	1 30	1 60		
Annattoine.....	1	26	30		
Aniline Oil, English.....	1	28	96		
Aniline Oil, French.....	1	50	30		
Aniline Salt, crystals.....	1	22	30		
Aniline Salt, cake.....	1	22	30		
Arcill Liquid, best.....	1	16	22		
Argols, crude Operto.....	1	7	10		
Argols, crude Sicily.....	1	16	20		
Argols, refined St. Ant. Brown.....	1	28	30		
Argols, refined (gray).....	1	30	33		
Argols, refined Light.....	1	28	32		
Aqua Ammonia.....	1	54	64		
Aqua Ammonia, F. F. F.....	1	6	8		
Aurine.....	1	75	90		
Barbary Root.....	1	5	64		
Barwood.....	1	18	20		
Bi-Chromate Potash.....	1	18	20		
Bleaching Powder.....	1	23	8		
Borax, refined.....	1	10	13		
Brazil Wood.....	1	5	6		
Blue Vitriol.....	1	8	10		
Brimstone, roll.....	1	31	31		
Camwood, pure.....	1	8	12		
Camwood, No. 1.....	1	10	12		
Carbonate of Ammonia.....	1	20	21		
Caustic Soda, 60 per cent.....	1	4	54		
Caustic Soda, 70 per cent and over.....	1	24	00		
China Clay.....	1	95	1 00		
Citric Acid.....	1	85	90		
Cochineal, Honduras.....	1	95	1 00		
Cochineal, Mexican.....	1	95	1 00		
Cochineal, Black Teneb.....	1	1 00			
Copperas.....	1	1	11		
Cream Tartar, crystals.....	1	86	38		
Cream Tartar, powdered.....	1	36	38		
Crimson Spirit.....	1	13	14		
Cudbear, pure.....	1	18	25		
Cudbear, No. 1.....	1	15	16		
Cudbear, No. 1, French.....	1	25	25		
Cutch.....	1	10	11		
Divi Divi.....	1	50 00	75 00		
Dipping Acid.....	1	10	104		
Extract Fustic.....	1	13	20		
Extract Hyperic.....	1	17	20		
Extract Indigo.....	1	17	20		
Extract Logwood, bulk.....	1	9	94		
Extract Quercitron.....	1	9	94		
Fluxive.....	1	20	22		
Fustic, Cuba.....	1	11	2		
Fustic, Maracabo.....	1	11	23		
Fustic, Savilla.....	1	11	2		
Gambier, bales.....	1	11	2		
(Gambier).....	1	11	2		
Green Ebony.....	1	4	5		
Hyperic.....	1	34	4		
Irish Moss.....	1	4	5		
Iron Nitrate.....	1	8	12		
Indigo, Auxiliary.....	1	10	12		
Indigo, Bengal.....	1	1 60	2 50		
Indigo, Caracoe, fine.....	1	95	1 05		
Indigo, Guatemala, fine.....	1	1 35	1 60		
Indigo, Madras, fine.....	1	95	1 05		
Indigo, Manila.....	1	85	95		
Lac Dye, fine powdered.....	1	10	15		
Lac Dye, good powdered.....	1	10	15		
Lima Wood.....	1	34	41		
Logwood, Campechy.....	1	11	2		
Logwood, Honduras.....	1	11	2		
Logwood, Laguna.....	1	21	22		
Logwood, St. Domingo.....	1	11	13		
Madder, Dutch.....	1	10	12		
Madder, French.....	1	9	12		
Maple Bark.....	1	7	8		
Marble Dust.....	1	1 50	1 75		

Myrabolans.....	1	5	6
Muriatic Acid.....	1	19	22
Muriate Tin.....	1	19	20
Muriate Tin, strong.....	1	21	3
Muriate Tin, oxy.....	1	19	20
Muriate Tin, crystals.....	1	21	3
Nitroced.....	1	7	7
Nitrate Iron, pure.....	1	7	7
Nitrate Lead.....	1	11	12
Nitric Acid.....	1	25	26
Nutgalls, Aleppo.....	1	25	26
Orcinole.....	1	16	22
Oxalic Acid.....	1	11	12
Pearl Ashes.....	1	20	25
Permal Bertrine.....	1	45	46
Pieric Acid.....	1	45	46
Potashes.....	1	5	5
Prussiate Potash, yellow.....	1	26	81
Prussiate Potash, red.....	1	13	2
Quercitron.....	1	21	4
Redwood.....	1	21	4
Red Sanders.....	1	8	8
Silicate of Soda.....	1	18	25
Starch, Corn.....	1	4	6
Starch, Potato.....	1	6	6
Starch, Wheat.....	1	4	6
Softener.....	1	24	40
Safflower extract.....	1	5 00	6 00
Sai Ammoniac.....	1	12	13
Sai Soda.....	1	12	13
Sassafras, green.....	1	18	25
Soluble Blue.....	1	88	87
Sugar Lead, brown.....	1	10	10
Sugar Lead, white.....	1	75 00	90 00
Sulphur, Sicily, according to grade.....	1	45 00	55 00
Sunace, Va.....	1	2	2
Soda Ash.....	1	2	2
Sulphuric Acid.....	1	55	60
Tartaric Acid.....	1	55	60
Terra Japonica.....	1	41	54
Turmeric.....	1	7	8
Ultramarine.....	1	30	32
Verdigris.....	1	30	32
Wood.....	1	10	12

BUSINESS OPPORTUNITIES.

F. J. BIRD, AUTHOR OF THE DYER'S HAND BOOK, is prepared to furnish reliable recipes in any Branch of Dyeing, and will have pleasure in matching to any color or shade for special customers, of his new Aniline Colors. See advertisement, page 8.

Address, 212 N. Market Ave., Brooklyn, N. Y.

RECIPES FOR DYEING, Whitening, Silk Process, Chemical Dyes; also, colors for Painters and Paper, can be obtained by addressing F. Franke, 127 Filbert Street, Philadelphia.

TO CAPITALISTS, DYERS, AND CHEMICAL MANUFACTURERS—A first-class establishment in the East, with the most complete and extensive company for the manufacture of a Black Dye; also a Tincture from raw material very abundant in this country, but not yet well known, and of great value, for reference and particulars apply to address, F. J. Bird, care of H. B. Garred, Banker, 115 E. Fourth Street, Philadelphia.

Chlorate of Potash from the Dead Sea.

Chemical analysis having long ago shown that the waters of the Dead Sea are rich in chlorate of potash, a company has been formed, and already commenced operations, to extract this salt from its waters. It is stated that in this way chlorate of potash can be obtained thirty per cent. cheaper than by the cheapest process thus far known, and as there is an increasing demand for this salt, it is a safe and profitable investment. In order to save fuel, which is scarce in those regions, the works are kept in the most active operation during the dry season, when the water of the river Jordan does not dilute it much, the water level varying considerably and consequently the concentration. This body of water, of course contains the soluble ingredients from the heights surrounding the whole water-shed, of which the rains have made a lye, and solar evaporation has concentrated it in that sea.

(Continued from page 58.)

Recipe No. 56.

DARK BROWN ON COTTON.

60 lbs. Cotton.

Lay down over night in

12 lbs. Cutch,
6 ozs. Blue Vitriol.

Take out, wring, enter 2nd bath, 3 lbs bichromate of potash boiling, give 4 turns, wring, and re-enter old cutch bath, adding 3 lbs. logwood extract, give 6 turns, back to old chrome bath, then enter: 3rd bath. 3 lbs. Copperas cold, wring and finish with 3 buckets Logwood Chips, ½ lb. Indigo Carmine.

Recipe No. 57.

METHYLENE BLUE ON GERMANTOWN WOOL.

50 lbs. Yarn.

Dissolve

10 ozs. Methylene Blue, OO, Pat. { Badische Aniline & Soda Fabrik.
Wm. Pickhardt & Kuttroff,
New York, Boston, and Philada.

In a boiling tub, cool off, enter yarn at 160° F., raise to boiling point, turn for 40 minutes and wash.

Note.—The bath may be made slightly alkaline, so as to fix the blue more to the fibre.

☞ This process is very simple, and the yarns will turn out very soft.

Recipe No. 58.

DARK YELLOW ON WORSTED.

50 lbs. Yarn.

Dissolve 3 ozs. Yellow N. { Boston Dyewood and Chemical Co.
Boston.

1 lb. Sulphuric Acid,
2 lbs. Sulphate of Soda.

Enter at 180° F., raise to boil and turn to shade.

Note.—Avoid as much as possible the use of copper vessels, as they will impair the brightness of shade.

Recipe No. 59.

DARK GREEN ON COTTON.

50 lbs. Yarn.

Lay down for 6 hours in

10 lbs. Sumac,
wring, enter 2d. bath cold,
3 lbs. Alum,
9 ozs. Methyl Green. Bluish,
2 buckets Fustic Lignor.

Turn quick and raise temperature to 150° F., after dye bath is exhausted add 4 ozs. copperas to the same bath, give 3 to 4 turns and done.

Recipe No. 60.

SCARLET ON COTTON.

60 lbs. Yarn.

Boil 10 lbs. Sumac; enter yarn, give 6 turns, let lie for an hour, wring and enter a

2d Bath, cold, of Nitrate Muriate of Tin 2° T., give 6 turns, wash in warm water, afterwards in cold water, wring well and enter

3d Bath of 10 lbs. Turmeric, then wash well and finish in dye bath of

½ lb. Safranin P. { Meister, Lucius & Bruening, Hoechst A.-M.
Lutz & Mevius, N. Y., Boston & Phila.

Enter at 50° F., turn continually while raising temperature to 120° F., wring and dry.

Recipe No. 61.

NAPHTOL YELLOW ON WORSTED.

30 lbs. Yarn.

Boil in clear water:

5 lbs. Glaubersalt,

½ lb. Sulphuric Acid,

½ oz. Naphtol Yellow Pat. { Badische Aniline and Soda Fabrik.
Pickhardt & Kuttroff,
New York, Boston and Phila.

Enter at 160° F., raise to boiling and turn to shade.

Note.—This new product is the brightest of all the Yellow Anilines so far introduced in the market, and especially useful for fine yellows with greenish tint.

NOTES OF THE MONTH.

All communications under this head will meet with due attention, and coloring matters will be fairly treated.

OBITUARY.—It becomes our painful duty to announce the death, at Berlin (Germany), of DR. PAUL MENDELSSOHN BARTHOLODY, one of the Directors of the Aniline Works in that city, after a long illness, at the comparatively early age of 40 years. We thank the Directors of the Actien Gesellschaft for their polite attention in notifying us of the melancholy event, which the hurry of going to press prevents our noticing more fully.

WE HAVE received from Mr. Alexander Barril, Agent, N. Y., sample of Puteau Blue, it is particularly recommended for wool dyeing or wool piece dyeing, and replaces indigo. We have made some experimental tests; will give more details and show dyed samples next month.

WE DRAW especial attention to the new product "Azobenzole Fast Crimson, R. patented, manufactured by the Badische Aniline and Soda Fabrik. See sample No. 53 this month; it is a valuable substitute for cochineal.

MESSRS. F. BREDET & Co., N. Y., have new products of Soluble Browns for wool and cotton superior to the Bismark brown now in the market, its advantages are cheapness, solubility and quality. We expect some samples and will produce them in our practical department.

A NEW patent taken in France for bleaching feathers, consists in using azotic of sodium and peroxide of hydrogen. Another patent is taken for discoloring fibres by the artificial light of electricity.

WE HAVE received from Leeds Manufacturing Co., N. Y., a pamphlet on Bird's new aniline dyes and mordants with full directions and price list. Dyers desiring a copy can procure them gratis.

BLACK ON COTTON.—A cheap black on cotton is obtained as follows. 1st. Complete scouring by carbonate of soda, and through rinsing. 2d. Bath of logwood for 15 minutes followed by drying in centrifugal. 3rd. Bath of bichromate of potash for same period at the rate of 6 ounces per pound. 4th. Another bath in sulphate of iron for 30 minutes. 5th. A washing in a bath containing a solution of bichromate of potash again. 6th. Finally a good soap washing, and the work if well conducted, is done satisfactorily.

LAURELINE.—Stimulated by European example, our American scientists are also searching for new coloring elements in the vegetable or mineral kingdom. We have been favored with a communication and some samples from Dr. W. H. Gregg, of Elmira, in regard to his recent discovery of a new dyestuff called *Laureline*, derived from esamphor. The sample of cotton yarn sent us is of a fine and bright yellow color which promises good results. Dr. Gregg, having also favored us with some of the coloring matter; we will have it tested and reported on accordingly. Regarding the industrial proportion which this discovery may lead to, Dr. Gregg expresses himself as follows, in his letter:

"I have not material to manufacture any large quantity, and until satisfied in regard to its value, shall not enter on this production in large quantities."

PRODUCTION OF SULPHUROUS ACID.—M. T. M. Clement recommends the following combination as an efficient discoloring agent:

Permanganate of potash,	450 g.
Chromate acid of potash,	160 "
Sulphate of soda,	390 "

These three salts form a compound which can be crystallized by evaporation and used to produce a bath, which, it is claimed, will generate a nascent sulphurous acid and act as an energetic discoloring agent on any fibre.

FEATHER BLEACHING.—It is proposed by Messrs. Viol and Duffot to bleach feathers in the following manner: To immerse the feathers in vessels containing either essence of resin or bituminous hydrocarbons, at a temperature of 86° F. They are left then for a greater or less period, according to the degrees of whiteness required, taking great care that they are well exposed to the light. When the feathers have become sufficiently white, which takes place after three to four weeks, they are wiped and finally dried.

WORTHY OF NOTICE.—According to Dr. Schuehardt, the use of permanganate of potash in dyeing will contribute towards fastening colors on linen and cotton and even shades on mixed goods. The material to be dyed is taken through a weak solution of permanganate of potash for a sufficient time to admit of its acquiring a light brown color. It is then washed in cold water and passed through a weak solution of muriate of tin. The brown color soon disappears; the goods are then washed and mordanted with tannic acid and finally dyed in the usual way. This process is said to economize coloring matter and to give good results, and it is claimed to be especially valuable for mixed goods, which can be dyed in a single bath with all colors, says the *Textile Manufacturer*. We would like to hear from any of our American dyers who may try it.

THE CHEMICAL COMMITTEE of the Industrial Society of Mulhouse (Germany), recently held a meeting at which many statements of interest to the community of dyers everywhere were made, amongst which was that of putting some quercitron rind for a few minutes into boiling water, and then filtering it through a cloth to get rid of the woody portion. Adding a little gelatine or gum while the water boils is preferable to using boiling water at once, as it discolors the dyestuff. The adulteration of ceruleine by galline was likewise alluded to, and the fact stated that the latter makes the shades fuller but duller. It was shown that the acidity in the atmosphere, together with the decomposition of the starch contained in the goods, had the effect of greening aniline black. The explanation of the action of

bisulphites in cerulean shades, by stating that bisulphite of soda forms with ceruleine definite compounds, is worthy of note.

Speaking of aniline black, Mr. Dreyfus, of Manchester, England, according to the *Textile Manufacturer*, declares his ability to give the world an ungreenable aniline black on textiles, by the very simple process of working the goods first in a weak bichromate of potash solution and then drying. Next, a color is to be got ready with thickened muriate of aniline, or any salt of aniline or toluidine, to which is to be added a sufficient quantity of salt of chrome, and this color is printed. The goods passed through carbonate of soda, washed; then through bisulphite of soda, washed; afterwards through weak sulphuric acid, washed; through chloride of calcium (common salt); finally soaped. We trust Mr. D's recipe may be found to work satisfactorily.

WHITE AS A COLOR.—In Europe, bleaching is but a preparation for white dyeing in many goods. They produce a regular white dye, covering the yellow tinge produced by chloride of lime. White dyes are made on this ground by the complementary colors of blue known as being the process of anurizing. But the mixture in certain proportions of the following colors, and the superposition of this mixture on the bleached goods, will produce white dyes: Purple and green, red and green-blue, orange and blue, yellow and ultramarine, yellow-green and violet. A few drops of this coloring matter will give any cast desired to the white dye.

ORANGE BY CHROME ON COTTON.—Dissolve 1 pound salts of saturine in 10 gallons of water; add 2 pounds of litharge. Boil until the deposit turns white. Let it settle. Enter the cotton in this mordant for three hours; take out and wring. Pass it through a bath of lime (1 pound) in 12 gallons cold water. Wash it and place it in the following bath: 375 grammes bichromate of potash, 500 grammes sulphuric acid; mix well; plunge the goods twelve times. Then pass again through the lime bath (boiling), wash and rinse carefully. The last operation is to pass it through a fuschine bath to the degree required.

ADULTERATION OF ULTRAMARINE.—This blue color is extensively adulterated with plaster. It has been proved that this adulteration sometimes reached 50%. The *Chemical Zeitung* denounces the Austrian manufacturers for pushing this fraudulent practice too far. The last contrivance by which they succeeded in perfecting this fraud, consists in dissolving the plaster in glycerine and syrup, then the mixture is incorporated with the regular blue and the fragments reconstituted. It has been detected from its sugary sweet taste.

THE FRENCH GOVERNMENT is not unmindful of its dyers, for, by an official decree, recently issued, silk tissues mixed with cotton, which require dyeing or printing, and are intended for exportation, are to be admitted into France duty free. This permission is but temporary, yet it gives a good chance to French dyers to extend their field of operations for the time being, and should it be found to work desirably, no doubt it will be continued. However, it cannot possibly affect our American dyers, as it is not at all probable our silk manufacturers would send their material to be dyed or printed in France when they can be just as well done at home.

GOOD BLUE FOR COTTON.—The following composition has been found effective as a special blue for cotton. For 20 pounds cotton, dissolve separately $\frac{1}{2}$ lb. tartar emetic, 2 lbs. sulphate of alumina, $\frac{1}{2}$ lb. sal soda. Unite these three solutions, and add to it a solution of 2 ounces prussiate of potash. These four ingredients form the first mordant. Prepare the second mordant by dissolving $\frac{1}{2}$ lb. tartaric acid in boiling water. Then have a warm water bath at 75°, and put in it the mordant No. 1 with 3 ounces blue previously dissolved in water. Enter the cotton and work it in for 15 minutes; take it out and pour in the bath the mordant No. 2, then enter again and work the goods for 30 minutes. Of course, the degree of shade is regulated by adding some blue. For dark blue the emetic mordant is not required.

BLACK ON SILK.—There are a great many processes for dyeing silk black. The most in favor are those that give weight as well as good color to the goods. Manufacturers have urged dyers towards this result. The first operation is always astringent, through a bath of cachou, nut-galls, and divi divi. Then comes the bath of pyrolignite of iron which takes care of the weight. However the black is only complete where the blue has been admitted and subsequently the alkaline bath and acid prussiate passage. A soapy bath with citric acid is always necessary on silk, to bring out the lustre. Regarding the prussiate, many dyers wastefully use it in excess; they do not always perceive that the acids used in the bath reconstitute the Prussian blue if a salt of iron is added.

PRIZES.—We expect to hear soon from Europe the result of the competition prize contest opened in Mulhouse by the Industrial Society of that great manufacturing city. 1000 francs is offered as a prize for a new good alumen superceding the white egg matter, and 500 francs for the best alumen of discolored blood.

QUERIES AND REPLIES.

Under this head we invite all our friends to make their inquiries on every subject connected with dyeing, etc., and we will endeavor to give them such information in answer as they are in need of. We also invite others to give us the aid of their experience in such replies. All will be welcome.

QUERIES.

54.—Please let me know what pyrolignite of iron is and to what industrial use it is most applied? J. H.

55.—What sort of ingredient is the iron-foot or pied-de-fer used in old times? G. C.

56.—Could you please state the original production of tartaric acid and tartar? L. D.

57.—I would be thankful for the explanation of the words indiane and indigotine, which I have lately seen quoted from French works on dyeing? S. C. B.

58.—Does chemistry require really so many incomprehensible names, and could they not be given out in plainer language? J. B.

59.—Thanking the TEXTILE COLORIST for the clear definition given in last issue on several technical terms in chemistry, may I take again the liberty of asking information regarding hydrometers and their relative unit points? J. C.

ANSWERS.

47.—First—Scald 1 lb. ground logwood in one gallon of boiling water. Steep them in it half an hour. Second—Then steep them in black iron, full strength, for two minutes and let them cool for five hours. Wash and dry cool. DYER.

54.—Pyrolignite of iron is the product of distilled wood, or acetic acid, saturated with iron. It could be as well termed acetate of iron. It is produced by two methods: decomposition and saturation. The first consists in subjecting particles of iron to the solvent action of a concentrated liquor of wood distillation in a close vessel. Lime neutralizes this pyrolignous acid in due time, and a solution of sulphate of iron precipitates it in forming the liquor called pyrolignite of iron, which is an energetic mordant for black dyes. The saturation process is applied by passing thin sheets of iron into a pyrolignous acid of 5° B., until the liquid is loaded with the oxide combined with the wood pitch until it reaches the density of 160° B., which is the proper degree of pyrolignite of iron. A few drops of this strong mordant colorizes water to a bluish green. It is the cheapest and the most efficient base for black dyes, and it is extensively used in Europe. The base of the aniline principle was in this process without the knowledge which coal tar has since brought to light.

55.—Foot of iron, also called black-tank, is a ferruginous acetate, similar to pyrolignite of iron. It was made formerly by the contact of vinegar with iron in fragments. Oil or gum was added to it to form a body. It has been superceded however, by the others of more recent and more perfect creation. The name, foot of iron, is derived from the fact that the process for producing that liquor consisted in placing a mass of iron fragments at the bottom or foot of the bath used for dyeing. These iron compounds are still in use for dyeing silk after the astringent of galls, cachou, or tannin have been applied.

56.—Tartaric acid is an organic obtained from the crude tartar found on the insides of the casks containing wine. It also occurs in the berries of the tamarind and of the mountain ash. The preparation of tartaric from the crude deposit of tartar, which is composed principally of bitartrate of potash, consists in dissolving this base in boiling water, and in adding some chalk, until effervescence ceases. The insoluble matter, called then bitartrate of lime, is precipitated, and neutral tartar of potash remains dissolved. This solution is then decomposed into chloride of potassium by chlorate of calcium. The product is well washed and digested with dilute oil of vitriol at a moderate heat. The tartaric acid is thus set free and the insoluble sulphate precipitated. When cool, the liquid is filtered and evaporated in leaden vessels to the consistency of sirup and allowed to crystallize under the influence of sulphuric acid. The various products derived from the operation are bitartrate of potash, cream of tartar, etc. The crude tartar is the brownish sediment collected from the tanks in which wine is stored; it is the source of all the tartaric ingredients chiefly used as mordants and medicines.

57.—Indicane and indiglucline are the sweet saccharine principles of the indigo plant which has its glucose element, like every other vegetable growth, in fermentation. They enter in the combinations which produce indigotine.

58.—Chemistry is logically obliged to denominate its various products according to their basic origin, in order to avoid confusion and obscurity. Generally the mere name of a product is sufficient to indicate its origin, character and property; such are the acetates, the benzoates, the azotates, the oxides, binoxides, peroxides, etc., which generate other diminutive or complexive products forming the large scales of chemical combination.

59.—Hydrometer, also called acetometer, is an instrument for ascertaining the specific gravities of liquids, and hence their strength, the latter being either in inverse or direct proportion to the former. Hydrometers are of two kinds: 1st. Those that are always immersed, to the same depth, in distilled water and in the liquid to be tried, small weights being used for the purpose, as in Fahrenheit and Nicholson's. 2d. Those which are made to rise or to sink freely in the liquid, until they come to a state of rest, as in Baumé, Syke's, etc. In both cases a correction must be made for any variation in temperature. Of the two kinds, the first gives the most accurate results, and has the great advantage of being applicable to liquid either lighter or heavier than water, but the second is the readier in practice, requiring less time and less skill to use them. The following are those best known: Beaumé's, Cartier's, Fahrenheit's, Guy-Lussac's, Nicholson's, Richter's, Syke's Tralles and Twaddell's. This last is generally used in bleaching establishments. According to this, scale 0. is equal to 1000, or the specific gravity of distilled water, and each degree is equal to 005; so that by multiplying this number by the number of degrees marked on the scale and adding one, the real specific gravity is obtained. We will give in our next issue a description of the other systems above named.

Dyeing Wool in Pieces.

BY F. GRISON.

Blacks.—The black colors represent the combination of blue, red, and yellow into their extreme intensity. They are obtained by various processes resting on the diversity of the coloring matters, and on manipulation. As all the methods in use tend to the same result, it is not necessary to describe them severally. The indication of the best few, those uniting beauty, solidity, and economy, will certainly be sufficient. As heretofore mentioned, there are five principal black colors, viz: black-blacks, blue-blacks, yellow-blacks, reddish-blacks, and greenish-blacks. The dyestuffs for these various shades are logwood, yellow wood, and curcuma. The mordants suitable for the same are bichromate of potash, sulphate of iron, sulphate of copper, and tartar. The whole process is applied in rotation as follows. From the bath of the mordant to the dye tub.

1. The mordant bath is furnished with 3 pounds sulphate of copper, 1 lb. sulphate of iron, and one pound of crude tartar, for 3 pieces of cloth weighing 60 or 65 pounds.

2. Enter after dissolution, and manipulate while boiling for one hour and half. This is the first mordant operation.

3. Let it rest one day, then prepare the dye bath as follows: Furnish the bath with one pound of sulphate of copper, 1 pound sulphate of iron, 2 pounds tartar, and 2 buckets of yellow wood. Enter the 3 pieces and manipulate them in boiling water for 45 minutes, take out, wash, and vivify as usual.

The best method of vivification for blacks is as follows. The lightly acidulated bath by sulphuric acid must receive different additions of dyestuff, according to the shade required, viz: For the reddish-black, a little logwood; for the black-black some yellow curcuma; also for the green-black. The blue-black requires nothing but the sulphuric acid already in this reviving bath. 20 minutes manipulation in this will be sufficient.

Solid Blacks.—Fast blacks are obtained by passing 4 pieces, weighing 80 or 90 lbs. through a muriatic acid bath,—half gallon acid. The pieces are manipulated in it for 20 minutes, at 40° F., then they are drawn out and boiled with some logwood. The vivifying bath for this solid black is made with 1/2 pound sulphuric acid, and 4 ounces curcuma for each piece, which must be agitated in it for 20 minutes at 40° F. Another bath of this kind is made, viz: 1/2 lb. tartar, 1 lb. sulphuric acid, and 1 lb. curcuma. It costs more, but gives superior results as a bright black.

Black from Bichromate of Potash.—The bath is furnished with 1/2 lb. bichromate of potash, 1/2 lb. sulphate of copper, and 1/2 lb. sulphuric acid for each piece of merinos weighing 25 lbs. Enter and agitate in boiling water for one hour. After this mordanting, the pieces are washed and subjected to the dye bath, composed of seven buckets of logwood, 1 of yellow wood, and some sulphuric acid. One hour's boiling and manipulating will dyo the goods. The vivifying is done by one of the above indicated baths, of which the one with tartar is preferable.

Observations.—1. The mordant of bichromate of potash must be carefully washed. This mordant has some very tenacious yellow particles which must be removed from the cloth before entering the dyeing bath. 2. Whenever the pieces are not satisfactorily dyed, the operation must be renewed. 3. The same bath can be utilized several times, providing the residues be removed to make room for fresh dyestuff.—*Teinturier Pratique.*

Method of Dyeing Straw Hats Black.

Various difficulties are often encountered in dyeing straw black; notwithstanding every care, there will be parts here and there which do not take the color sufficiently. Much experience has convinced us that all these difficulties may be avoided by adopting the following process: Take a lye of potash or soda and add to it a solution of gluten that has been allowed to dissolve thoroughly for twenty-four hours previously. When the gluten has become thoroughly incorporated with the potash or soda, a lye is obtained in which (the liquid having been previously filtered through coarse linen) the hats are dipped and allowed to remain for twelve hours. By this means the straw is deprived of its fineness and takes the character of an animal product, as it were.

When the hats are dried sufficiently they are put into a solution of sulphate of iron in nitric acid; the straw is allowed to remain twelve hours in a cold bath of this description, and is then taken out and dried.

Next, boil logwood and put the hats into the hot fluid, to which add a solution of gall-nut, or sumac, or still better, tannin. Some double chromate of potash produces a good effect.

In order to impart the necessary gloss, further means must be used. Gum or gelatine is employed for this purpose. When everything is complete, rub the hat with a woollen cloth and apply lightly a little oil. Finally, rub it once more with a dry woollen cloth in order that no speck of fat may remain on the straw.—*Clothier and Hatter.*

Prizes for Dyers.

The Industrial Society of Mulhouse (Alsace), has offered a series of premiums in money and medals for the production of various substances pertaining to the art of dyeing. Besides substitutes for albumen, of eggs and of blood, the following indicated improvements are offered various rewards:

Medal of Honor for a scouring and bleaching process, removing all the amylaceous matters (gum, grease, paste, etc.) from brown cotton, without injuring the cloth and without important increase of cost. For a fast green resisting light and soap, and fixing without the use of albumen; this green must be brighter than ceruleine. For a transparent color, applicable to calico printing, with results similar to those of aniline black, resisting air, light and soap, also acids without any of the inconvenience of naphthylamine. For a metallic alloy or any other substances proper for scrapers of rollers, and uniting with the elasticity and hardness of steel the property of neutral action on the acids or salts of the various colors in use on the rollers. For a new machine with rollers printing eight colors at a time, and offering some advantages over those existing and in use at present. For a cheaper good gray color, soluble and applicable on cotton with steam colors, and resisting acids, alkalis and lights. For the production by synthesis (recomposition of an analyzed substance) of one of the coloring natural agents industrially used. For an automatic and simple regulation of steam in the bleaching or dyeing kiers. For the best treatise on the discoloration and bleaching of rags. For a system of refrigeration in factories during summer without changing actual plants in use. For a dyeing apparatus superior to the existing ones. For an invention preventing the accidents which occur frequently to hands in the circular wool-combing machinery and in the preparers.

The competition for the above wants took place last month. We probably will be able to report the results in the next edition of the TEXTILE COLORIST.

Bleaching Silk and Wool.

Animal fibres cannot be bleached by the same agents which bleach vegetable textiles. Wool and silk are generally bleached by sulphurous acid. But this process always leaves a yellow tinge on the fibre. To remove or to hide this defect, a blue or violet col-

oring matter, such as indigo-carmin, ultramarine, cobalt or Berlin blue, etc., is introduced in the fibre. This method does not give satisfactory results whenever the action of the light or the air and also of washing are operating on the textile.

To avoid this inconvenience, M. Kallab proposes to use the hyposulphurous acid, and an indigo blue which resists the discoloring agents of the air or the light. But instead of using the blue bath after the bleaching, he applies it previously, that is to say, a light blue bath, made of 1 gramme indigo for 30 gallons water. The cotton is left in it for a few hours. Then it is removed, wrung, and placed in a bleaching bath made as follows: A tank containing a solution of hyposulphite of soda, some acetic acid, and water sufficient for covering all. The goods are closed in for twelve or twenty-four hours. The indigo turns a white tint under the influence of the acids, especially when the cotton is taken out and exposed to the air, which completes the fixity of the white-blue. The operation can be renewed and the bath be fortified, as required for the degree of whiteness desired. Silk can be treated by the same process, but the bath must be weaker in hyposulphite and acetic acid.—*Musee de l'Industrie Belge.*

Cheap Dyeing.

The cheapest black dyeing of the trade is made in Vienne, Department of Isere, France. Black cloth is dyed there as low as \$2 per 200 pounds of cloth, all included, and the work is not necessarily inferior to more expensive dyes done elsewhere. Either from peculiar properties in the water, or in the atmosphere of that place, the French dyers of the district have reduced the art to an extreme degree of simplicity and economy. A few tubs in a yard constitute their factory. They use no fuel, no steam, no power of any sort. They dye by the cold process, and as quickly as by the hot method. One tub contains pyrolignite of iron, another logwood, and a third washing water. All the work is done by hand, and such are the natural facilities of the operation that the results are satisfactory for both manufacturer and dyer at the stipulated rate per 100 kilos. That section has such a reputation for cheap and fair black dyeing that it attracts a large business for that black specialty in Vienne. That city is in bu, on account of the black dye, what Pittsburg is, from coal and iron products,—quite a dark city.

Lisieux is another cheap black centre; it competes so strongly with Vienne that sometimes this latter place gets behind. Of course, like some fierce rivals in a noble cause, they frequently insult each other in pretending that they produce nothing but "negroes' head black," the gravest epithet which can offend a French dyer. The retort is generally that the other knows nothing but "smoke dyeing," etc.

Lisieux does not succeed in the cold process like her antagonist. They operate there by different methods and ingredients. For instance, for 10 pieces, 4 of 15 kilos each, they will proceed as follows: Haiti wood, coarse, 35 kilos; yellow wood, 6 kilos; sulphate of copper, 3 kilos; sulphate of iron, 5 kilos; nut-gall, 5 kilos, or 7 kilos of sumac. They start the dye with the coloring matter for 71 hours, then they add the salts of iron and copper in the same bath, boiling

FOR BLACK HATS.

for 45 minutes. It appears that sometimes, the first bath being too dense, the black is dull, and called "negro-head black" as an indication of failure. Otherwise those *Lisieux* blacks are generally successful, though not always as cheap as those of Vienna.

Coloring and Fashion Items.

Spring colors are coming out rapidly, with a decided firmness against timid shades. Gay varieties and a creamy ground on French buntings are again in favor. Peacock, scarlet and purple satin pleatings at the foot are much admired. Wool and silk imported dresses are generally adorned with purple, red and blue in drapery. Heliotrope and pinkish mauve shades are also conspicuous, besides light drab, purple satin, scarlet plush facings and beige shades. Foulard dresses are trimmed with blue velvet or dark rich satins. The dull and the blending lines are thus displaced by sharp, bright tints of the oriental style.

The cotton dress goods for spring are flowery on a satiny surface, reuovating, with improvement, the Dolly Varden figures, although on better and more durable goods. Foulard imitation in the *bandana* handkerchief style, comes in a cheaper but yet an acceptable form. This agreeable printing of pieces or stripes is always new, though being the oldest pattern in the art of figuring cotton goods. Economy and preservation demand some care in the washing of these figured cotton goods, otherwise their value would be of a short duration,—in fact, just that of a transfer to the washing tub. To preserve this class of goods with some degree of freshness, laundresses must use sugar of lead for fixing blues, and always for greens. Sometimes salt will answer the same purpose, but starch cannot be used and the ironing must be done on the wrong side.

American silk dresses are becoming more numerous on the street. So far, black, pongee and tea colors are the limits of shade in that style of goods; but the brilliant Japanese colors, already successful in American ribbons, will also soon take their place in more substantial fabrics of ladies' apparel.

In walking suits the blues seem to predominate. The coat called "Directoire" is the recipient of all the blues beneath the sky, under various names, such as gendarme blue, navy blue, blue-grey, black-blue, army blue, etc. As part of a necessary contrast, olive, brown and drab (couchman drab) are also in view. This "tout-aller" dress style is the reverse of the flourish figuring of the renovated Dolly Varden above mentioned.

Colored lace is a new fashion in Europe but not come out yet in America. Turkey red is revived, in the form of turkey-red calico, as worn forty years ago.

The new ribbon called *merveilleuse* has changeable colors through the centre.

Dyeing and Finishing Hats.

COMPOSITION FOR FINISHING GRAY HATS.

1 kilogramme of light colored gum lac, 200 grammes of sandarac, 15 grammes of oxalate of potash (sorel salt and potash). Alcohol, 85° strength necessary for solution.

1 kilogramme of light or cherry-colored gum lac, 100 grains of sandarac, 15 grammes of Venetian turpentine.

In both compositions about three quarts of alcohol are required, that is to say, as much as will cover the resins to the extent of about two centimetres.

The difference between the two compositions is, that in the first sorrel salt is used, and there is a larger quantity of sandarac, so that the hat is rendered harder. This hardening would be injurious in a black hat, because the dyeing naturally renders the felt harder.

As to the alcohols to be employed in the first composition, first comes that to be found in thick wine, next that derived from beets, grains and potatoes.

The compounding is done in a bath of boiling water, into which the vessel containing the ingredients is set; this vessel must be closed but not hermetically, otherwise there would be an explosion.

If the operation is on a small scale, finishing composition is prepared in a pot covered with a double layer of strong paper tied round the mouth with twine. The evaporation that takes place through the paper is sufficient to prevent an explosion.

When a large quantity is to be prepared, it is proper to provide a copper vessel, or one of iron covered with tin. It should be well glazed, and the cover should have an aperture for the insertion of a tube. Into this aperture is inserted a perforated cork, through which is passed a glass tube projecting outwardly at least 50 centimetres (20 inches nearly). By this arrangement a channel for evaporation is provided through the tube, and all danger of explosion is avoided. There is this advantage besides, that nearly all the alcoholic vapor condensing in the tube under the influence of the cold air, it falls back again into the liquid in the vessel, and so there is next to no loss of alcohol.

For a perfect result two boilings are necessary. It is not enough that the gum be dissolved, but the ingredients must be made to commingle intimately, and the whole must have some consistence. Although it is not indispensable that the gum should be steeped for twenty-four hours previously in alcohol, yet there is this advantage in doing so, that the result is obtained much quicker.

OBSERVATIONS.

The finishing composition being prepared as above directed, a portion,—about one-third,—is poured out, to be reserved for dressing the crown of the hat, which requires an application of somewhat thicker consistency. The two remaining thirds left in the vessel are diluted with alcohol and applied to the sides and brim of the hat, as these parts require an application that shall penetrate their substance completely, while with the crown this is to be avoided.

EXTRACT OF CHESTNUT TREE A SUBSTITUTE FOR GALL.

To dye hats with the above-mentioned new economical product instead of gall, it is essential that the felt, in the fulling of which acid has been used, be well cleansed with clean water before bringing it in contact with the chestnut tree extract. The best way is to fill with water to which shall have been added a little of the extract, and nothing else. This is to be regarded as a beginning of the

dyeing process, which is to be completed afterwards. The operation of fulling is accomplished more or less rapidly, according to the quantity of extract employed. This extract, as commonly compounded, is too much thickened by the addition of molasses, crystallized substances, and other ingredients of small value.—*Clothier and Hatter.*

Dyeing Felt Hats Maroon

Wet them well with hot water containing a little carbonate of soda. Then prepare bath with carbonate of soda, brush them with a soft brush, rinse well and dye. For 40 hats:

Sumac,	10 lbs.
Orchil,	5 "
Sulphate of copper,	12 ozs.
Turmeric,	5 lbs.
Copperas,	4 ozs. 121 drachms.
Logwood,	1 lb. 8 ozs. 121 "

Boil 30 to 40 minutes, lift, rinse and dry.—*Monit. de la Teinture.*

Luminous Colors.

It is a well known fact that certain sub sulphurous and alkaline earths are phosphorescent in obscurity, if they have been previously exposed to the light. They absorb and store the rays of the sun, and afterwards radiate them in the dark. The glow worm, the fire-fly (*lucifer*) and some rotten dry wood are phosphorescent, from this simple principle of absorption and refection contained in the sulphurous substance agglutinated on these bodies.

On these premises a great many attempts were made principally in Europe, in France in particular, to make and apply, industrially, luminous colors so accumulated. M. Becquerel has invented processes by which these results were obtained quite satisfactorily. Several patents have been taken on processes which consist generally in manufacturing a powder, having this remarkable property of attracting and representing the light, as aforesaid. But like many good inventions, this was not extensively carried out in France, outside of scientific demonstrations, such as luminous paper, luminous clocks and dials, more or less expensive to produce, and the processes are kept secret.

In England the idea made better progress. A chemist of note, M. Balmale, has succeeded, after many years of experimenting and searches, to produce a luminous paint, phosphorescing at night. He had discovered some sort of sulphurous calcium and baryta, produced by various marine shells, which concentrated the light to a superior degree, and radiated it very effectively at night.

But somehow, this new step did not yet reach the industrial considerations. It remained dormant until recently, when Messrs. Illies and Home, of London, made new and successful efforts on the same basis. It appears that the practical point has been attained by this fresh attempt. The precise composition of the luminous ingredients forming the base of their paint is still veiled in deep secrecy; they decline taking patents on their discovery; but it is known that they use the ordinary lime from sea girts after a certain calcination.

Their paint is really phosphorescent after being applied with the ordinary paint brush. Some experiments are now being made by the English admiralty in gun powder magazines on land and on board ships of war for the purpose of avoiding fire-light in it. Lighthouses, mines and cellars will soon be lighted by this new method. But the

most interesting experiments to be made with this extraordinary substance is that of dyeing and printing cloth, calico, silk and wool goods which will radiate so much light that parlors and ball rooms may dispense with the present expensive gas illumination.

Black Sewing Silk.

Paris has had the monopoly of the best black sewing silk, but Lyons has gradually improved her product to such a degree that she now competes successfully with Paris in this line. The best blacks for sewing silk are monopolized by a few houses in these two cities; they keep their methods with such a careful secrecy that the trade has to comply with their terms. The important point in the black sewing silks is the suppleness, as well as the fast, brilliant dye so much admired by connoisseurs. The best are those called oriental blacks or blue-blacks. They are soft, supple, solid, and eminently fitted for tailoring, because they facilitate the passage of the sewing without any hinderance whatever. The methods for obtaining good blue-blacks of orient, are founded on the following process: Boil in soap: pass through pyrolignite of iron several times; enter galls and Prussian blue at a temperature of 60° or 80° C. for six or eight hours. Then in a bath of salt of pewter with divi divi. After good rinsing and the ordinary treatment, the silk is subjected to an emulsion bath composed of olive oil *without acid*. Should more suppleness be required, a bath of subacetate of lead will complete the process. From the dyers, the sewing silk undergoes the ordinary frictions and torsions which will develop its lustre and regularity.

The American Dyeing.

While the review of the industrial progress of the United States elicits the most legitimate sentiments of satisfaction, as to general results, we must be permitted to feel a little pride in our progress in the arts of cloth dyeing and printing. Not many years ago any ordinary plain dyeing in America was considered as a daring feat. At that time the merinos, the delaines, the cashmeres, the calicoes, the woollens and the silks in general, were imported and looked upon as being almost out of reach for Americans to imitate. Any attempt to obtain the same shades and finish was treated as visionary. Every dye shop had to be decorated with big signs announcing itself as a FRENCH DYEING ESTABLISHMENT to secure a scanty patronage from a prejudiced community. In fact, the trade then, had but little dyeing to do outside of spoiled or damaged imported goods. The only establishment of any importance was located in South Eighth Street, below Walnut. But, though fairly furnished with steam machinery, and backed by a New York capitalist, this dyeing institution failed after a few years for want of "grist to the mill." It was too large and too expensive for the then slow-growing manufacturing city. To-day Philadelphia has many establishments larger than this respectable one was at that time.

We must remark, as another illustration of the protective influence, that this fact occurred during the operation of low tariffs, before the Secession War. European dyeing at that time could be imported at such rates that there was no chance for home enterprise

in the dyeing and printing line. But the scale has singularly turned since. This department of textile industry has acquired so much under the fostering system of the protective tariff that, regarding colors and shades, taste and combinations, this country can hold her own. In fact, our American dyers and printers are gaining so much ground in the art, that the European dyers are getting astonished and feeling curious regarding this rapid development. Our own people are not the less surprised.

Many colors and styles from American manufacturers are so original and tasty that they frequently pass for being imported from the most artistic centers of Europe. There is nothing like the knowledge of what can be done, to develop the power of a man or of a nation. Once penetrated with the reality of their ability and capacity, our dyeing and printing corporations will reach a positive equality, if not a superiority, with Europe. We hold the most favorable elements conducive to this result, pure air, excellent water, ingenuity, spirit of study, ambition and boldness, all that, backed by unlimited material and means of execution. Wherever these factors are brought into play, success is certain, as many flourishing establishments daily prove.

Recent Patents Connected with the Dyeing Trade.

Aluminous Cake: Carl V. Petraeus, Philadelphia, March 9th, 1880.—Process for manufacturing a white aluminous cake from feruginous aluminous sulphate, by treating this in solution with alkaline sulphides of alkaline, earth or metallic sulphides. *Brief:* Reduces lead to a fine powder by blowing steam through a jet of the melted metal, or makes a spongy lead by precipitating it from its solutions by a metal, as zinc, or by the action of nascent hydrogen or sulphate of lead. *Claim:* The described process for manufacturing white aluminous cake, by reducing the peroxide of iron in feruginous sulphate of alumina, by adding metallic lead in the state of fine powder or in a spongy condition and then boiling or otherwise agitating the solution.

Apparatus for Dyeing and Washing Yarns and Cloth: H. D. Gray, Jr., South Manchester, Conn., March 24, 1880.—An apparatus provided with a frame carrier furnished with slots and sockets, combined with supporting flanges, bearing bars and slide rods on which the goods are suspended. A rope moved by pulleys and a crank lowers or lifts the whole frame in or out of the dyeing tanks.

Metalizing fibrous fabrics: R. Waite, Boston, Mass., March 24, 1880.—A process depositing metallic salt on fibrous substances and coating it fast by galvanic action.

Frame for Dyeing netted fabrics: H. Dewaele, Philadelphia, March 24, 1880.—A frame provided with wires and bars, having tenter-hooks to attach the goods, and a sliding combination to be widened or narrowed at will. The netted fabrics are kept stretched on the frame, etc.

Dye-stuff or coloring matter: F. Kohler, Ludwigshafen-on-Rhine, assignor to Badische Aniline and Soda Fabrik, Baden, Germany, February 24th, 1880.—*Claim* as a new manufacture the bluish-red coloring matter produced by the action of the sulpho-acid of diazo-benzene upon alkaline solution of a bisulpho-acid of betanaph-

thol, substantially as described, or by any other means which will produce a like result. Also, the red coloring matter obtained by the same combination.

Machine for Beating and Washing Silk: T. E. Bolton, Patterson, January 13th, 1880.—A machine provided with swinging rollers and beaters, by which the hanks of thread are swung against a slab, all moved by pulleys, etc., while perforated pipes distribute the washing liquid.

Wool-washing Machine: F. G. Sargent, Westford, Mass., January 6th, 1880.—In combination with the table and carrier, a finger is attached to the rake end of the machine to distribute the wool.

Acids on Cotton.

It has been found that sulphuric acid deteriorates cotton fibres, and in many factories it has been superseded by chlorhydric acid. Sulphuric acid in the wash reacts on the chloride of lime, and while it liberates the chlorine it creates a sulphate of lime which deposits on the fibre as a calcareous and insoluble matter. This explains the harshness of cotton sometimes after the bleaching operation. It also accounts for the yellowish tints of the goods, besides the brittleness which follows. The sulphuric acidulation combined with the lime, attracts oxidization from the air, that is to say the deteriorating influence of oxygen, which is the great consuming agent of nature.

Muriatic acid acts as a solvent, and not as a precipitant on chlorine of calcium; it renders it soluble in water. Therefore it eliminates it easily from the cotton fibre when the washing is properly conducted after bleaching. It is true there is the antichlor ingredient (hyposulphite of soda), which removes the chlorine from the fibre, but it forms some acids which deteriorate also the cellulose. The best antichlor known so far is ammonia. It destroys the chlorine and the acids at the same time. After the ordinary double washing the cotton is passed in a bath containing one thousandth part of its weight in ammonia. Then a good wash removes the ammoniacal odor, and the goods are ready for any subsequent application. It may be useful to state here that the best scouring of cotton, previous to bleaching is made with lime and molasses in the following proportion: For 200 pounds of cotton, 5 pounds lime, 2 gallons molasses in sufficient water to cover it and boil 3 hours.

Controversy on Calcium and Chlorozene.

We have been favored with jarring critical remarks from a member of the New York tinctorial trade, in regard to the allusion made by our co-editor (Mr. E. Le Frane), on calcium as a metal, in his essay on Chlorozene, page 4, of the January issue of the TEXTILE COLORIST. That gentleman said: "Brittleness and harshness of fibre are produced by decay, or by the crystallization of aluminous matters combined with silica. The oxidation of air acts on fibrous material bleached by chloride of lime as it does on lime water. It creates with the astringent salt, a vitrious coating of the well known metal calcium. Hence, the various defects invisibly attached to fabrics which have not been radically freed

from deposits, and the discoloration worked in by time. No such destructive operation can take place in the bleaching by chlorozone, for the simple reason that there is no element for oxidation, nor deposits of salt in its composition."

The tinctorial doubter, in question, derisively objects to the existence of calcium as a metal, and asserts with a high degree of self assurance and pseudo authority, that such a metal is unknown in chemistry (!) It is not for the first time we see this curious confusion of trade with science, and of shop with laboratory. Calcium not having been yet elevated to the dignity of current goods sold by cargoes, it has not been admitted into the high sphere of knowledge of our trading scientist. Therefore, forsooth, it cannot exist in the chemical world. But we shall be charitable towards our modest (?) sneering critic, in giving him the free teaching conveyed in the following information in regard to the metallic substance which he so superbly ignores.

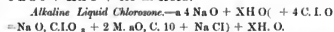
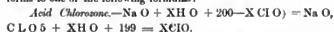
Calcium.—A metal of the second group, having for its analogues barium, strontium, and magnesium. It is one of the most abundant substances in nature, forming a large portion of the crust of the earth. It occurs in nature in combination with fluorine as *fluor spar*, with oxygen and carbonic acid as chalk, limestone and marble, and with oxygen and sulphuric acid as gypsum, which is hydrated sulphate of lime.

Calcium was first obtained by H. Davy, by electrolysis, but little was known of its properties until Dr. Mathiessen formed it by the electrolytic decomposition of a mixture of the chlorides of calcium and strontium. It is a *light yellow metal* of the color of gold alloyed with silver; it is rather harder than lead; it melts at a red heat, and is very malleable. It tarnishes in a day or two; even in dry air, and in a moist air it becomes slowly oxidized. It burns with a brilliant white light when heated in air, chlorine, or the vapors of iodine, bromine, and sulphur. It rapidly decomposes, even at ordinary temperatures. It has been obtained by Messrs. Lies, Bondard, and Jobin by acting on iodide of calcium with sodium. No other metal is so largely employed in a state of combination as calcium; for its oxide, lime, (Ca.O) occupies among bases much of the same position as that which sulphuric acid holds among the acids, and is used directly, or indirectly, in most of the arts and manufactures. The specific gravity of calcium is 1.55; equivalent 20; symbol Ca.

Now, we will proceed to the chemical constituencies of chlorozone, which seems to be as objectionable as calcium in the scientific estimation of our able objector.

Chlorozone.—It is well known that the oxygen of the air, in its nascent state, combines with chlorous gas, and forms hypochlorous acid, and that water at the ordinary temperature, dissolves 200 times its volume thereof. It is also known that a current of hypochlorous acid, passing in excess through any alkaline solution (oxide, carbonate or chloride), converts these salts into chlorates. Starting, therefore, from these premises: if on the one hand, hypochlorous acid be produced by the decomposition of a hypochlorite by means of an acid in conjunction with a current of air, and, if on the other hand, an alkaline solution is saturated with this gas, it is evident that the product obtained will be chlorozone.

Chlorous and ozone. This product will be either alkaline or acid, according to the equivalents of the base in solution and of the hypochlorous acid with which it is saturated. According to theory, the results of this reaction should be a pure alkaline hypochlorite, which is a very unstable salt; but, owing however to the influence of a constant current of air, the final product of the operation is a triple salt, which, according to circumstances, conforms to one of the following formulas:



Both may have a very high discoloring power. This fact is evident—if the current of air, drawn in during the manufacture, be shut off, and if the quantity of decomposing acid be halved, chlorine gas will be evolved, and not hypochlorous acid. The product will then be a common hypochlorite. (The alkaline chlorozone marking 40° B. and 100 to 120 chlorometer degrees, becomes easily crystallizable at a low temperature; but the crystals are melted readily by the least heat.)

Therefore, there are two modes of producing chlorozone: one acid, the other alkaline. But the acid chlorozone being unfit for displacement on account of its evolving expansion, should be manufactured and used directly, after being made, on the spot. The alkaline chlorozone having more permanency in an ordinary temperature, can be transported as a liquid in carboys, and be used at any time, and anywhere. This is the kind which we advocate. The manufacture of chlorozone is simple enough in principle, but it requires a certain amount of skill and experience. The apparatus employed in the production is composed of a hypochlorous acid gas generator, of two saturators, an air pump or exhauster, working by steam or water. The ingredients used are hydrochloric acid, alkaline salts, ozone, and indigo.

Process for Printing Many Colors in One Operation.

A new invention by Messrs. White & Anderson claims the practicability of printing an unlimited number of colors in a single operation on tissues and papers of any kind. The process consists in making a paste of adequate coloring matters, which can be hardened in a required time. It is cut in blocks with a scroll saw, according to the drawn designs. The various colors in paste are shaped in like mosaics and placed in a chase to form plates. The substance has the peculiar property of being sufficiently softened by turpentine to discharge slightly on the cloth or the paper subjected to it under the press, as is usually done. In short, the coloring matter and the designs constitute the plate or block direct, and furnish the discharge of color as long as its thickness will allow.

So far as we can see by the French report on this process, the application is yet limited to winding designs made by slices of various coloring pastes encircling each other. But there is no reason why the principle would not allow other shapes of delicate designs, flowers, figures, etc. The composition of the paste is the

essential part of this new idea. It is a compound made as follows: 25 parts of fine lard, or tallow of Russia or Australia; 12½ parts of paraffine or of beeswax, 5 parts of rape seed oil, 25 parts of venetian turpentine, 5 parts of pure linseed oil with 3 parts of alumine. This mixture is boiled for one hour, agitating it constantly, then filtered, and deposited in vessels to cool. This is the base of the various coloring pastes required. A small portion of the coloring ingredient is mixed with a portion of this paste to make as many colors as desired. It is this putty, which being cut delicately in slices, can constitute the coloring shades of any given design in mosaic style. Supposing the design to be a rosette on a blue ground, with a deep gray center, and a light-gray circumference, the operator takes first a deep gray block, and he cuts in it the centre place of the rosette, and surrounds this with the respective slices of the colors called for by the design. The whole being placed in a block becomes hard enough after a while to receive the turpentine's action for a regular discharge on the cloth, or on the paper in print, which can be dried or evaporated as usual.

Azuring and Soaping of Cotton.

Ultramarine is a blue powder, of a shade more or less bright, and of a cast more or less of blue rose. It is difficult to know its degree of coloration without testing it by actual use. It being insoluble in water, it is a coating application, not a dye. Ultramarine is composed of silicate of soda, sulphur of sodium, and silicate of alumine. It is produced in heating red a mixture of kaolin, (China clay or silicate of alumine), of sulphur, and carbonate of soda. Its shade is deep, in proportion with the temperature to which it has been subjected. The highest degree producing the darkest blue. The rose cast is obtained by adding, after the operation, some little fuchsine. Artificial ultramarine is due to M. Guimet. The natural used to come from the Eastern country, where it was found in some ores with a beautiful blue color. It was the lapis lazuli, constituted of 36.94 silica, 35.92 alumina, 23.93 soda, 3.19 sulphur, in a hundred parts.

Azuring by ultramarine is generally for white hosiery and upholstery fabrics. A certain quantity of ultramarine in boiling water gives the tinge required for the object. Azuring by Berlin blue is specially reserved for the white goods of the calicos style. Berlin blue comes in the trade under the form of small irregular cubic fragments. It has neither odor nor flavor. It resembles indigo, like which latter, friction creates copper shades on its surfaces.

The preparation of Berlin blue consists in pouring a solution of ferrocyanide of potassium, or yellow prussiate of potash into a salt of iron, viz: To 6 parts of sulphate of iron, to 6 parts of prussiate of potash dissolved in 15 parts of water; then one part of sulphuric acid with 24 parts of chlorhydric acid. After a few hours the gradual addition of chloride of lime will precipitate a blue, which a simple washing will furnish you. So the Berlin blue can be made anywhere. The expert can see readily whether the blue is good or not, but the surest proof is that of a test.

Soaping.—The alkaline action on a fat body is called saponifi-

cation. Potash, soda, water, and oil will make a soap. The fatty or oily body is always composed of oleic acid, margaric acid, stearic acid, and of glycerine; a matter soluble in water. The combination of these ingredients constitutes hard or soft soap, according to the degree of evaporation performed, and the alkalies entered. The hard is obtained from soda, olive, palm, arachia, cotton, or almond oils, also from fats and any grease. The soft are made with potash, but the hard soaps are the most in use. They are soluble in water, except when metallic oxides are introduced, as for medical plasters. Soap manufacturing is a simple process. Oil or fat is boiled with a caustic soda solution. The contact of the two matters forms an homogenous liquor, to which is added some fresh alkaline solutions in boiling. The soap, after a certain time, rises to the surface, then the heat is cut off, and the liquor under the soap is decanted or drawn as being useless for saponification. It contains glycerine, which can be extracted by another process. In order to proceed to the formation of good soap, some fresh and strong alkaline liquor is brought in again, and the boiling is resumed until the soap is well saturated. This is evident when the mixture is transparent, and soluble in hot water without eyes on the surface. Of all the soaps made and sold in commerce, the Marseilles soap is the best. Its marbled aspect indicates a pure soap, containing but about 4 water. Soap is used to prepare the bleaching of all the tissues made of cotton. The alkali it possesses unites with the cleginous matters contained in the goods, and forms a saponification which cannot injure the textile.—H. Caren.

CARMELOINE.—A new coloring matter, giving a brown color, of a hismark shade, is just out in France. It is a finer shade than the latter, which it improves considerably. The *Teinturier Pratique* speaks of it as follows: "Carmeloine gives fast and cheap browns, of various shades on wool. It can be mixed with sulphate of indigo, orsilla, curcuma and the aniline products which can bear sulphuric acid as a mordant, such as fuchsine, orocelline, orange, etc. It is worth 12 francs per kilogramme, and the cost of dyeing is about two cents per pound, so far as the ingredients are concerned."

SOLUBLE GLASS.—Speaking of soluble glass, as applied to dyeing, the *Muster Zeitung* has the following practical remarks: "It is found especially useful when employed in connection with aniline colors, and lately also in dyeing Turkey red, on account of the property it possesses of giving up silicic acid when in contact with other acids. Silica is precipitated in the fibre, either by previously mordanting in silicates or in the bath itself; the first plan is adopted when the color does not dye the fibre if only in solution, when the precipitated silicic acid fixed on the fibre will help the color to dye it. The second is used when the coloring matter is too soluble, and therefore does not dye the fabric. The process of dyeing is always a kind of filtration with colors which dye the fibres direct, when the coloring matter penetrates the fibrous material and remains there. Of course the dyes must be in this case so soluble that they are capable of penetrating completely into the interior of the fibre, otherwise they remain on the surface, causing looseness and rubbing off. If the coloring matters are too soluble then they do not remain in the fibre,

but are washed out again by the liquor, except in cases where a direct combination is formed between the fibre and the color. If to such dyestuffs water glass or any other substance is added, which has the property of thickening the flats, and to form very finely divided combinations with the color, then the material is dyed as with dyes of less solubility. A passage afterwards through an acid will precipitate the silica completely, and thus form a combination of the color with the fibre, at the same time brightening the shade."

ALIZARINE for violet, is "fixed" in print by using an iron mordant in place of a mordant of alumina; the color succeeds well with the red prussiate. Alizarine for red, is also applied for printing and dyeing, and takes the place of madder. The mordants of alumina give red or pink; the mordants of iron give the violets as aforesaid; the mordants of chrome give the browns; the mordants of uranic give the greys. Dark alizarine colors are obtained by the mordants of red prussiate, of acetate of chrome, and extracts of wood. With the action of certain fat-acids applied on the tissues before printing the color, some fast and solid reds have been obtained.—*Teinturier Pratique*.

NEW PROCESS FOR BLEACHING VEGETABLE FIBRES.—In order to avoid the destructive action of chlorine upon the fibre, Paul Bayle and Rinaldo Pontiggia propose to bleach and cleanse vegetable tissues by placing them in a basic (alkaline) bath made up of alkalies and chloride of lime, with the addition of margaric, stearic or oleic acid, or oils obtained from the distillation of rosin. These fatty matters are dissolved in some suitable liquid, such as the essence of rosin or the light coal tar oils. Instead of such a solution of fatty acids, there may be used the slime of linseed, of earth nuts, or of Panama bark *Quillaja saponaria*. By these additions the destructive action of the chlorine is lessened, and the solution of the gummy and resinous matters of the raw fibre is facilitated.

A DYK STUFF, said to be the bark of the root of the juniper tree, is exported from the province of Tripoli. The tree grows in great abundance in the interior. The dye is extensively used in Egypt, to which it is almost solely exported.

It is predicted that prune color will remain one of the favorite colors for the summer.

The new and fine French bunting is called Albatross cloth this season, and comes in a multitude of new shades.

SAFFRON-TINTED lace is much in favor for trimming evening dresses, and is even seen on some of the new handkerchiefs.

HELIOTROPE is the new color, and is exactly the lovely pinkish purple of the newly blown flower from which it takes its name.

Tinctorial Glossary.

(Continued from page 48).

BANDANA, a kind of handkerchief with white figures or spots upon a red or dark ground, manufactured in England and Scotland, where the original pattern has been much improved. To produce the figures or spots, holes of the proper shape and size are pierced in two metal plates, one affixed to the upper and the other to the

lower part of a press. The cloth, previously dyed Turkey red, or some other colors, is folded into 12, 16, or 20 thicknesses placed in a compact pile between the two plates and heavily pressed by them. A liquid solution of chlorine is made to flow over the upper plate; it passes into all the holes; finds its way through all the thicknesses of the cloth, then escapes through the sides of the lower plate. During its brief passage it extracts all the color. The pressure is so great, (300 tons), that under the skilful adjustment of the contrivance none of the chlorine liquor deviates sideways to act upon other parts of the cloth. This is a variety of the *discharge style* adopted by calico printers. (See Calico Printing).

BLUE.—The color of the sky. The principle pigments are Ultramarine, Prussian blue, blue verdita, bice, cobalt blue, iron blue, etc. The principal blue dyes are auline blue, indigo, prussian blue, methyl blue, etc.

BLUE CLAY.—A kind of clay formed of a very fine pulverized slate.

BLUE COPPER.—An ore of copper of an indigo blue color.

BORACIC ACID.—Small brilliant colorless crystals which have a greasy feel; it is inodorous and possesses little taste. It is obtained artificially by the action of sulphuric acid upon borax, and in natural state in the Hot Springs of Sasso, near Florence. It is used in the manufacture of borax as a flux in metallic operations, in making enamel, etc.

BORATE OF LIME.—A mineral containing about 50 per cent. of boracic acid, imported from Peru for the manufacture of refined borax.

BORAX.—A salt procured in an impure state, called *tinco* or *rough borax*, from a lake in Thibet, and exported by way of Calcutta. Tinco is imbedded in a kind of soapy matter. When lumped it is called borate of soda, and occurs in a rather large white semi-transparent crystal, having a sweetish alkaline taste. It is also prepared artificially in the United States from boracic acid, soda and borate of lime. It has been found in some lakes of Utah, and other Western sections. This alkaline salt is employed in soap making, as a flux in the arts, and in medicine as a detergent antiseptic.

BROMINE.—A substance obtained by a chemical process from the uncrystallizable residue of sea water commonly called *bittern*. It is a liquid of a deep reddish brown color, and disagreeable suffocating odor. It is used for the same purpose as iodine, and also in photography. It has a bleaching power and is poisonous to animal life.

BROWN COTTON.—Unbleached muslin, varying from 27 to 108 inches in width. It is bleached by the process referred to in the bleaching paragraph.

BROWN OCHRE.—A pyroxide of iron.

BROWN SPAR.—A crystallized form of carbonate of iron.

BROCINE OR BRODIA.—A very bitter vegetable alkaloid, extracted from the bark of *Strychnos nux vomica*. It gives a blood-red color with concentrated nitric acid.

BUFF.—A color somewhat between pink and primrose yellow, generally applied on leather and kid skins for gloves.

CADMIUM YELLOW.—The commercial name for the sulphide

of cadmium, an artist's paint. The finest and most permanent of all the yellow pigments in use.

CACTINE.—The red coloring matter obtained from some species of the cactus plants.

CAFFEINE.—The active nitrogenous principle giving flavor to coffee. Name given in old times for shade resembling to the coffee color.

CALCARIOUS SPAR.—A carbonate of lime.

CALCIUM.—The metallic base of lime.

CALICO PRINTING.—The art of producing figured patterns upon cotton cloth. It comprises mechanical and chemical processes which require much skill. It has been practiced in India and China for many ages. The word *calico* being derived from Calicut, on the coast of Malabar. Calico printing requires several chemical processes. The dyes and colors are of two kinds,—those which penetrate through the whole substance, showing almost as brightly on one surface as on the other,—and those which are intended to be seen only on one side. They comprise almost the same series of animal, vegetable, and mineral substances as the dyer is in the habit of using; but there are additional precautions necessary to insure fast colors. The color mixing constitutes the important part of the art; it requires a considerable knowledge in practical chemistry. The mills and stones for grinding, the rotating machines for mixing, and the cauldrons for boiling or heating, partake of the usual mechanical character, but there is much else to attend to in relation to the qualities of the various dyes and colors. Some must be thickened with starch, flour, or gum, to make them act more like a paint than a dye. Some have the mordant combined with the colors instead of being used separately. Some require a liquid vehicle that would be inappropriate for others. Some require steam to act upon them after they have been applied to the cloth. Block printing was the early method for cotton printing. The pattern or device was engraved on the surface of a large square block of sycamore, holly, or pear wood. This plan is still in use for choice patterns, of which only a small supply is likely to be needed. The patterns may be built in relief with narrow slips of copper, or reproduced by electrotype. The color is spread out on a cushion or pad; the block held by a handle at the back takes up a thin layer of it. This layer is applied by hand pressure to the cloth smoothly spread out on a table, and so on. If the pattern comprises many colors, there is one block to each, and the blocks are used in regular succession, each filling up its proper place in the design. The cloth is shifted on as fast as it is printed, and a new portion brought forward at each shifting.

PENKOTINE PRINTING.—Is a method used in France and Belgium. Three long wooden blocks engraved with the pattern are made to fit upon three sides of a square prism of iron. The prism rotates upon a horizontal axis; the calico or muslin passes between the prism and the bed, and the action is such that the tissue receives a long stripe of colored pattern every time it touches one of the blocks.

CYLINDER PRINTING.—This is the method by which the great bulk of printed goods is produced. The pattern is engraved on a roller or cylinder instead of a flat block. The roller is of copper

or brass; a coating of varnish or wax is given to it; the pattern is etched on the varnish with a diamond point, and then eaten in, or engraved by the action of dilute nitric acid. Sometimes the engraving is impressed by Perkin's rolling machine. Sometimes, again, the engraving is done by an engine like that employed in engine turning, and occasionally the rollers are of wood, with patterns made by inserting slips of copper. The rollers are from 30 to 40 inches long, by 4 to 12 in. diameter. There are as many rollers as there are colors,—one to each. There are also many distinct troughs or cells of dyestuffs or pigments as there are colors, and the cylinder machine is a skillfully planned apparatus, by which these rollers are, and troughs can be brought into action, each one at its proper time and proper place. Some elaborate patterns have as many as 20 different colors and shades of color. This arrangement is complicated, but from 1 to 4 colors is the most usual number. So perfect are the adjustments of this machine, that one mile of calico can be printed in one hour. The accessory machines in a calico print works are numerous. The printed cloth is dried by a gas-heated drying machine. Then transferred to the airing room where the action of the air sometimes aided by a little jet of steam causes the color to adhere more firmly to the fibres. The *clearing* *book* is a vessel in which the printed cloth is scoured with soap when some particular kind of color is used. There are also washing machines for clear water, rinsing, etc. The *madder* *style* is the name given to a particular series of process with a machine specially adapted to the madder as a principal dye. Also the *indigo* *style* when the printing is with a resisting paste, which prevents the dye from attacking some special spots. The *padding* *style* is a third series mostly suited for mineral colors, and requiring some of the colors to be in a thickened state. The *discharge* *style* is a fourth called also *bandana*, applied on handkerchief cloth with white figures or spots upon a red or dark ground dyed on the Turkey red principle, (see *bandana*). The steam color style, largely employed for furniture chintzes, requires the action of steam to fix the colors upon the cloth.

(To be continued).

WANTS.

Manufacturers desiring help in any department, or persons wanting employment, can have their wants advertised in this column for the low rate of 5 cents per line. No other advertisement will be admissible in this department.

A FOREMAN DYER

in Old England.

ANXIOUS TO COME TO AMERICA.

WANTED.—A situation as Foreman Dyer of Calicoes in all kinds of colors and shades to patterns. 15 years practice in the most busy and largest Black and Grey Works in Old England. Address, with terms, John Hilton, 32 Taylor Street, Tongue, near Middlewich, Lancashire, England. Samples of work can be seen at this office.

WANTED.—Situation by a competent Wool, Cotton Warp and Skein Dyer, Star, etc. Can give good reference. Address, L. L. E. 615 Walnut Street, Room 25, Philadelphia, Pa.

WANTED.—A FEATHER DYER, competent to do all feather work. Address, C. F. Q. 55 Temple Place, Boston.

A QUALIFIED DYER FROM SCOTLAND is open for an engagement as Fancy Glasgow Dyer, with a good firm. Can dye FAST BLACKS, BLUES and DRAB, as also, ALLEGHENY, BROWN, &c. &c. Will sell recipe of Blue, Black and Drab, for cotton and silk in all stages. Reference, K. Haines, Agent, Greenwell, N. H. Address, A. McLenn, D. L. North Manchester, U.S. P. O. Box, 27.

WANTED A SITUATION by a competent, well-experienced dyer, who has worked for the firm of J. & D. Paton, the largest Woolen Manufacturers in Scotland of Bervinville and Fanny Tweed Cloths, and for four years in the employ of Titus Salt, Sons & Co., Saltaire, Yorkshire, England, and with other eminent firms, having served a seven years apprenticeship in the first dyeing establishment in Paisley, Scotland. Address, J. McK., one of TEXTILE COLORIST, 10 Nassau St., Philadelphia, Pa.

TEXTILE COLORIST.

Entered according to Act of Congress, in the year 1880, by DR. M. FRANK, in the Office of the Librarian of Congress at Washington, D. C.

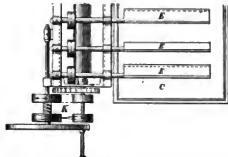
Vol. 2.

Philadelphia, April, 1880.

No. 16

Movable Coloring Machine for Yarn in Hanks.

The annexed engraving represents a useful machine patented in Germany by Leo Carree, of Dusseldorf. The following is its description, as given in Reimann's *Färber Zeitung*:



The horizontal reels E, E, E, over box C of the movable coloring machine, have a cross-cut which forms a dislocated surface. This will, in accordance with construction, occupy different positions during the rotatory movement, by which the changes of one position into another alternately take place slowly and quickly. The hanks will be moved up and down, separated, and again put together by this operation. In order that the threads of the hanks will not be entangled, the gear K is supplied with a mechanism by which the reels will move forward and backward. This change of the movement is effected by a self-acting advancing mechanism.

On Calico Printing.

BY DR. M. HASENCKLEYER.

(Continued from page 8.)

AGEING.

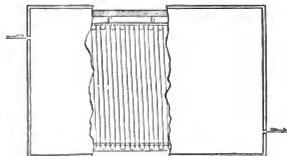
As the process of ageing is principally used for madder dyes and only in a few instances for other colors, it will here only shortly be mentioned. Ageing, seasoning, fastening or oxydizing is done in a high and lofty department. It was formerly called stoving, because the printed pieces were hung up in rooms heated by stoves. There was no moistening of the air connected with the heating of the room, and only ten or fifteen years since the air was moistened with direct steam and at the same time heated with steam. This has shown an important improvement to prints, the designs get more distinct and the colors brighter and deeper.

The ageing is, besides for madder styles, which will be mentioned at some other place, very important for anilines, and especially for aniline black. When the black is first printed on the cloth, it appears grey or dirty greenish, and in the ageing hall it gradually changes the color. The green gets deeper, and gradually turns into a dark greenish black. The time which is necessary for ageing aniline black is generally forty-eight hours. The pieces are first hung

up on rails at the ceiling of the hall, and allowed to remain there for above-mentioned time. In the meantime, the position is changed once or twice, as the lower hanging parts do not get acted upon so readily as the higher ones. After they have hung their time on these rails, they are led through a large box about 20 to 30 feet high, filled with ammoniacal gas. The size of this box has of course to be regulated by the quantity of the goods which shall pass through, and the speed; it ought to be made the size that the goods can be in every part of it for at least ten to fifteen minutes.

This ammoniac process has first been introduced by John Lightfoot in 1863, who says, in his patent, that "alkaline earths may be used for raising the black, such as caustic soda, caustic lime in solution in water, or the goods may be passed, after printing, through

No. 1.



a box containing rollers supplied with ammoniacal gas, which I prefer when the black is printed along with steam colors prior to steaming the goods."

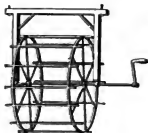
This is, however, at present not only done, as mentioned in above patent, if aniline black is printed together with other colors, but only with the single black also. It has proved to be of great advantage, as it develops the black much sooner and better.

STEAMING.

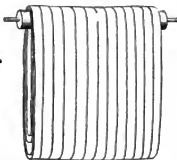
There has been very much experimenting done before the steaming process reached the state of perfectness which it possesses now. It was first applied in England and immediately afterwards in France. The pieces were before that time heated by stoves, without giving them any chance to attract moisture. They did not show good results, as the colors never could be gotten uniform. Only when they commenced to apply moisture, together with heat, they began to come out more perfect. We understand by steaming, besides fixing the colors and making them insoluble, the raising or developing. Many colors look very dull before steaming, but get very bright and deep by this process and washing afterwards. Many of the printed styles do not need ageing, but go directly from the printing establishment into the steaming room. The printed cloth, before it goes to the steaming room is divided into pieces of fifty yards each, and each piece hung over a wooden roller.

with the printed pattern inside. The dividing into pieces of the given length is done on frames, over which they are turned twenty-five times over; the circumference being two yards, the fifty yards can therefore easily be counted off. The pieces show also marks at each fifty yards apart. The steaming apparatus consists of a box made of boiler iron, which is riveted, and the door to be screwed on very tight. The pieces are rolled in on a frame, upon which the rollers with printed pieces are placed. The frame can be arranged to

No. 2.



No. 3.



carry from twenty to thirty rollers. Before work is commenced the frame is taken out of the box on rails, then supplied with the pieces, then rolled in again and the door closed tight by means of screws. When this is done the steam is let on.

There are different opinions in almost every print-works about the time of steaming, as well as heat and moisture. Whilst in some works they first steam a certain length of time, then take the frame with the pieces out and air them, then putting them back again and steam a second time, other works consider it better to finish the process by once steaming for the required time, using an apparatus connected with the frame to turn the pieces, whilst in the box without opening it.

Dry steam or steam with not sufficient moisture, never will show good results, as the goods have to be thoroughly softened. It might appear that too wet steam might make the colors too thin and make them liable to run through one another, thus producing bad goods; but this is hardly possible, even if a considerable excess of moisture is let in the box through the steam. The largest and most successful works which produce the modern steam colors, use the steam perfectly saturated with moisture and only of 212° F. These works always have a regular current of steam blowing off from the box, in order to take the acid gases out which get free by the steaming from the mordants. The free acid gases may injure fine and delicate colors, and it is therefore very important to remove them as quick and thorough as possible. Some works place slacked lime at the bottom of the steam box which shall absorb the acids, but this way never showed so good results as the other one.

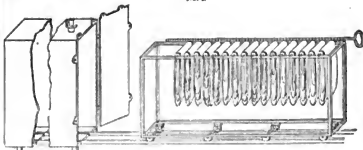
The time of steaming varies according to the style of prints, and can be from thirty minutes up to several hours, but there are only a very few colors which need more than one hour's steaming. The heavier the color the longer steaming is required.

For very delicate colors, light drabs, pinks, etc., the pieces are covered with grey cloth at the whole length before they are put on the rollers and in the steam box. This is done in order to prevent

them from getting stained or injured, which is easily possible with delicate colors.

It is pretty important to have the steam which is used for the steaming process as pure as possible. It often carries with it small quantities of sulphuretted hydrogen, which can be caused either from the water used in the boilers, or more possibly from the boiler itself. This sulphuretted hydrogen would blacken metallic colors, as lead, copper, chrome, etc. It would likewise injure many other colors. Many or nearly all metallic colors are thickened, partially or entirely, with albumen, and they have to be steamed very carefully on account of the sulphur which the albumen contains. After the pieces have been steamed for the required time the box is opened, the frame rolled out, and the pieces taken from the rollers. They first require some airing, which is done by rolling them again over above-mentioned frame once or twice, and are then taken away to some place where they are allowed to cool entirely, and then get washed and the thickening taken out. The washing is done for most colors in flat boxes about fifty to sixty feet long. The pieces are spread out in these boxes, and water turned on and run over on for some time, after which they are taken out again and dried in the centrifugal machine. These machines are placed in a horizontal way. The turning wheel, in which the wet pieces are placed to be dried, runs in an iron box, which is closed as soon as the inner wheel is put in motion. By the rapid turning of the inner wheel the water is slung out, and it does not require many minutes to get the pieces in such a state of dryness, that they can be dried completely over the drying cylinders.

No. 4.



For a few colors, aniline black, etc., many print-works have the pieces washed in a weak solution of soda or silicate of soda, by which the colors often get brighter and deeper, and then after partial drying are washed in water and treated the same way as the other pieces.

To be continued.]

On the Various Azo Colors now Sold in Commerce.

BY JAMIN STERRINS, JR.

(Continued from page 54.)

ITS BEARING AGAINST NITROUS ACID.

Chrysoidine under certain circumstances seems to yield a diazo compound, but it is so unstable that even at the ordinary temperature it is decomposed, yielding large quantities of nitrogen, and a resinous substance. The diazo compound of meta phenylendia-

mine behaves itself in the same way. In both cases a yellow oil may be extracted with ether, which as yet has not been examined.

ACTION OF CONCENTRATED SULPHURIC ACID.

If chrysoidine is heated for a short time with strong H_2SO_4 , and then poured in cold water, a heavy precipitate is obtained. This is collected on a filter, washed, dissolved in ammonia, and then treated with an aqueous solution of baric chloride, and heated for a short time. On cooling, fine golden yellow leaflets of the barium salt of chrysoidine sulpho acid crystallize out. By repeated crystallizing from boiling water, this salt may be obtained pure.

A barium determination gave the following results.

(Calculated)	$(C_{21}H_{21}N_4SO_3)_2Ba$	(Found)
Ba	19.95%	18.80%

The soda salt is easily soluble, and crystallizes in golden yellow leaflets. It is obtained by treating the free acid with $KOH + ag$. The copper salt is precipitated in the cold, but turns red on boiling, and crystallizes out on cooling.

If the barium salt be treated with the calculated amount of hydrochloric acid, the free chrysoidine sulpho acid is precipitated in the form of a dark-brown precipitate, which, on being boiled with water, yields fine red crystals with metallic lustre. The chrysoidine sulpho acid still retains basic properties, as it is pretty soluble in dilute hydrochloric acid with a carmine red color.

The constitution of this acid may be determined by its reduction products. After the tin of the reduction products had been freed from the solution, a little alcohol was added, and the mixture submitted to distillation. Only slight traces of aniline were found in the distillates. From this it may be seen that the sulpho acid was bound to the benzol nucleus derived from aniline, and is therefore probably in the para position.

Chrysoidine sulpho acid submitted to dry distillation, chars and yields small quantities of aniline, similar to its mother substance; it is likewise a pretty dye, but its shades are a little browner. The long description of chrysoidine and its derivatives may seem rather tedious to some readers, but I deem it necessary that this interesting compound be well understood before proceeding any farther, as the next three compounds that we shall consider, are characterized by nearly the same properties as chrysoidine, and therefore knowing what we have just described, it will be easier to understand what is to follow.

The dye nearest allied to chrysoidine is "toluol orange" or azobenzol diamidotoluol, $C_6H_5-N=N-C_6H_2CH_3(NH_2)_2$, (Journal of the American Chem. Soc. 1879, p. 467), and may be prepared as follows. If an aqueous 10% solution of tolylen diamine be treated with a 1% solution of diazobenzol nitrate, the solution assumes a deep orange red color, and after an hour's standing the mixture becomes filled with fine red needles. These are then thrown upon a filter and allowed to drain. They are then dissolved in boiling water, and the base set free by ammonia in the form of fine yellow leaflets. They are nearly insoluble in water, but quite soluble in alcohol. The analysis of the base dried at $100^\circ C$, gave the following figures:

Calculated for, $C_{12}H_9N = N - C_6H_2CH_3(NH_2)_2$

C	156	68.95%
H	14	6.19%
N	56	24.78%
	226	100.00%

FOUND.

C	156	68.95%
H	14	6.19%
N	56	24.60%

It is evident from these data, that the formula set out is correct. The base unites readily with acids to form salts, of which the hydrochlorate is the prettiest, and may be obtained by adding the calculated amount of hydrochloric acid to the base, and heating gently for a short time. On cooling, the hydrochlorate crystallizes out in fine crimson needles, which, however, turn darker in contact with the air. It is very soluble in warm and cold water, and alcohol in all proportions, and dyes animal fibre of a fine orange color in a neutral bath with or without mordants.

This method of preparing the hydrochlorate is sometimes unsuccessful, because, unless the strength of the hydrochloric acid be known in advance, the calculated amount may contain much too small a percentage of anhydrous acid, or too great a quantity for a successful reaction, and I therefore prefer using the following device.

In the larger part A, of the apparatus shown in the cut, the dry base is introduced, and a stream of dry hydrochloric acid gas is passed through it. The acid will thus unite readily with the base, generating a certain amount of heat, and all excess of acid may be driven off by placing the apparatus in boiling water. In this way

a hydrochlorate may be obtained, containing just the quantitative amount of acid. The substance may be easily removed from the tube by dissolving it in hot water, and then allowing it to crystallize. Toluol orange unites with metallic chlorides in the same way as chrysoidine, producing pretty crystalline double salts. Among these may be mentioned the zinc double salt, obtained by treating a concentrated aqueous solution of the hydrochlorate with a solution of zinc chloride. A heavy orange crystalline precipitate is thus obtained, which is collected on a filter and dried. It is quite soluble in water, and dyes silk and wool as readily as the hydrochlorate. Platinum chloride, in like manner, produces a precipitate, consisting of beautiful crimson needles. These, however, turn black when left in contact with the air.

ACTION OF STRONG SULPHURIC ACID.

If the dye be heated for a short time with strong sulphuric acid, and then poured into cold water, a copious brown precipitate of the sulpho acid is formed, which, when converted into its soda salt is quite soluble in water, and like chrysoidine, produces a browner shade than the hydrochlorate.

ACTION OF REDUCING AGENTS.

If the hydrochlorate be submitted to the action of strong reducing agents, (as tin and hydrochloric acid), the solution is decolorized, and aniline and triamidotoluol are formed.

(To be continued.)

Air and Light on Colors.

In order to insure the permanency of color we should give it the power of resisting not alone vegetable acids, alkalies, soap, etc., but likewise the destructive effects of both light and air. However, the inference here referred to is depended on the textile to which the required color is sought to be applied, and likewise the color itself. The action of water, of alkalies, acids and soap, is easily perceived, by these agents a solution is effected, or a small portion of acid or alkali unites to the combination which forms the color; for this is not destroyed, but merely changed, and can be restored by removing the acid or the alkali. But not so with the action of light and air. In what this peculiar action consists, or whence its destructive power comes may not be uninteresting to our readers, and we will therefore proceed to review it:

Scheele had observed that oxygenated muriatic acid (chlorine) rendered the vegetable colors *yellow*. This effect he ascribes to the property it possesses, of seizing the phlogiston which enters into their composition.

It has been proved that the properties of oxygenated muriatic acid arose from the oxygen, which it readily yielded to the substances exposed to its action; that it commonly brought the coloring particles to a yellow hue; but that, by a continuance of its action, it destroyed their color.

Several observations have been made on the action exercised by oxygen on the coloring particles, and much light has been thrown on the changes which they experience, especially when their aqueous solution remains exposed to the air, or when it undergoes ebullition. By the action of the air, vegetable decoctions formed pellicles, which lost their solubility and progressively changed their color. The gradations of color thus obtained, proved that oxygen entered into the composition of these coloring particles; that when it combined with them their hue changed; that the more of it they absorbed the more fixed their color became; and the mode of procuring unchangeable colors for painting was to select those which had been exposed to the action of oxygenated acid.

In order to determine wherein more particularly the action of the air consists when combining with the coloring particles, and especially examining the operation of oxygenated muriatic acid upon them, we shall quote the reliable statements of Professor Berthollet in his admirable "Elements of the Art of Dyeing," a work which, though old, is yet an authority. He says:

"We must distinguish, in reference to the effects of the air, between the colors of metallic oxides and those of the coloring particles. I have proved, that the modifications of the former are owing entirely to the different proportions of oxygen; but I have been led by my observations to a different opinion concerning the modifications of the other coloring particles.

"I have observed, that the oxygenated muriatic acid exhibited different phenomena with the coloring particles; that sometimes it discharged their color, rendering them white; that more frequently it caused them to become yellow, dun, brown, and black, according to the intensity of its actions; and that, when their color seemed to be discharged or bleached, heat, or the lapse of time, was sufficient to render them yellow.

"I have compared the effect produced by oxygenated muriatic acid, when the coloring particles are rendered yellow, fawn, or brown, with the effects of a slight combustion; and I have shown that they were identical, that they were owing to the destruction of the hydrogen, which, combining with oxygen more easily, and at a lower temperature than charcoal, leaves this predominant, whence the natural color of charcoal is blended more or less with that which pre-existed.

"This effect is very perceptible, when sugar, indigo, or the infusion of nutgalls or of sumac, is submitted to the action of oxygenated muriatic acid. The sugar and indigo assume a deep color, and afford unequivocal traces of a slight combustion. The infusion of gallnuts or of sumac forms a black deposit, which is charcoal nearly pure."

These phenomena are analogous to those observed in the distillation of an organic substance. In proportion as its hydrogen is disengaged under the form of oil, or in the state of gas, the substance turns yellow, and eventually only a black charcoal remains. If we expel the hydrogen of an oil by heat, it becomes brown.

Other experiments which I have made on alcohol and ether have satisfied me, that oxygen united to muriatic acid possessed the property of combining with the hydrogen, which abounds in these substances, so as to form water.

When, therefore, oxygenated muriatic acid renders a color yellow, dun, or brown, this effect is caused by the coloring substance suffering a slight combustion, in which a greater or less part of its hydrogen has formed water; whence the carbon becoming predominant, communicates its peculiar color.

I have shown, that the art of bleaching goods depended on this alteration of the coloring particles by the oxygen of the atmosphere, the dew, and oxygenated muriatic acid. The coloring particles of flax become soluble in the alkali of the lye, which must be alternated with the action of the oxygen. We may afterwards precipitate from the alkali these coloring particles, which when dried and collected are black. They therefore prove the truth of this theory, both by the color they have assumed, and by the quantity of carbon they afford in their analysis.

"The alkaline solution of the coloring particles of the cloth, which is blackish-brown, loses nearly its whole color on pouring into it a quantity of oxygenated muriatic acid; and the same effect may be observed with several other substances, which have derived a color from a commencement of combustion.

"A cloth may appear white, and yet become yellow in process of time, especially if it be exposed to certain degrees of heat, when the oxygenized particles have not been removed by a sufficiently efficacious ley. In like manner, the green particles of vegetables are bleached by the oxygenated muriatic acid, but become yellow on ebullition.

"These facts prove, that oxygen may whiten or render pale the coloring particles with which it combines, whether it has begun to produce on them the effects of combustion, or whether it may produce those effects but slowly, and especially when this combustion is subjected to a certain degree of heat.

"It is very probable that, in every case, one portion of the

oxygen unites with the coloring particles without combining particularly with the hydrogen, and that thereby the coloring particles of the flax have become, from the action of the oxygen, more soluble in the alkalies than they previously were.

"The action of oxygen has an undoubted influence, in several other circumstances, on the changes effected in the coloring particles of vegetables. These particles are formed chiefly in the leaves, the flowers, and the inner bark of trees. - By degrees they experience a slight combustion, either by the action of the atmospheric air which surrounds them, or by that of the air carried into the interior of the vegetables by particular vessels; whence it happens, that the most part of trees contain coloring particles of a dun hue, verging more or less on yellow, red, or brown, which, by means of this combustion, thickened, and are eventually thrown out of the vascular fibres of the bark, of which I have found them to form the greater proportion.

"These observations teach us in what manner the air acts on coloring substance of an animal or vegetable nature: it first combines with them, making them weaker and paler, and gradually establishes a slight combustion, by which the hydrogen in their composition is destroyed; they pass to yellow, russet, dun; their affinity with the stuff seems to diminish, they are detached from it, they are carried off by the water; and all these effects vary, and are finished more or less quickly, and more or less completely, according to the nature of the coloring particles, or rather according to the properties which they possess in their actual state of combination.

"The changes which occur in colors, arising from the combination of the coloring particles with the metallic oxides, are a compound effect of the change produced in the coloring particles and the metallic oxide.

"The light of the sun accelerates greatly the destruction of colors; it ought then (if the theory which I have laid down be just) to favor the combination of the oxygen, and the combustion thereby produced."

(To be continued.)

On Ostrich Feather Dyeing.

BY PAUL ALEX., PRACTICAL FEATHER DYER.

(Continued from page 54.)

In last month's journal I stated that I would give to the reader the names of all the dyestuffs used by me. This, for the present I must postpone. A recipe for black which was very popular about 10 years ago, and which is still retained by a number of our dyers,—those old orthodox dyers I mean, who think they know more than any one else, and refuse to take notice of anything new, and consequently remain in ignorance. It is as follows: For 5 lbs. of feathers take two lbs. of ground tumeric, one lb. fustic, one of sumac. Boil about two hours, add one pound copperas; boil half an hour longer. Have a large tub ready; spread out your feathers in it, having previously prepared them by washing; pour over the bath; cover up and let remain over night and the next forenoon. In the afternoon prepare a bath as follows: Five lbs. extract of logwood, one lb. sumac, 3 ozs. bichromate, two ozs. verdigris, 2 ozs. bluestone, 2 ozs. nut-galls, one oz. salanolic. Boil for three hours. Take feathers

out of last bath and rinse thoroughly. Rinse your tub out and lay your feathers in again, and pour over the second bath. Cover up and let remain over night. Take out and rinse thoroughly. Next prepare a tub-full of soap suds, and wash until all the loose color is extracted. They generally require two or three good washings, also three rinsings, and as there are from 75 to 100 strings, according to size of feathers, in 5 pounds, it is a good day's work for one man. Third bath, 4 lbs. chip logwood. Some use extract instead. Let boil two hours; pour over feathers, and let remain over night. Take out in the morning and rinse. Give a good strong bath of bichromate of potash with a small pinch of salts of tartar. Let remain in bath about fifteen minutes, take out and rinse, then wash thoroughly and rinse, and you have your black.

Now, I don't by any means condemn that recipe; it is not so bad, and was considered good in its day. So was oil, until gas was introduced for light, and took its place. Gas as a light is very satisfactory, although some of the bills were not reduced until the electric light was introduced, which, when perfected will certainly take the place of gas. It requires about five days to make that black, and I think I can make a better in about 30 minutes.

To feather dyers let me say, in buying dyestuffs, always get the best and purest. They may cost more in the beginning, but they cost less in the end. With the mechanic, good tools accomplish one-half the work. With dyers good dyestuffs do more than half. Every feather dyer should know the process of drying, which is generally to dilute a small quantity of starch in water; rub your feathers in it, take out, hang on line, and beat on board until all the starch has disappeared from the fues. Now, to save time, and you know time is money, instead of spending one or two hours beating feathers on a board, cracking the quills and breaking and tearing out the fues, I just have some fine powdered starch and rub my feathers thoroughly in it, give them a few raps on the board and they are dry. I would advise buying the best starch, for I have found that common starch often contains a limey or chalky substance that will often injure your color.

(To be continued.)

More on Luminous Colors.

Since the issue of the last edition of the TEXTILE COLORIST, containing an instructive article on luminous coloring matters derived from phosphorescent shells, calcium sulphides, etc. Some developments of the question have reached us, showing the industrial importance attached to the subject. An exhaustive lecture revising the history of the discovery and its vicissitudes, was recently delivered before the Society of Arts, London, by C. W. Heaton, F.R.S. As it frequently happens, for important revelations, these luminous properties in earthy minerals were first observed by an humble individual, a shoemaker of Bologna, named Vincenzo Ciacciorolo, who picked up a heavy brightening stone and being at that time feverish on the subject of alchemy and somewhat enthusiastic on the current ideas of transmitting vile metals into gold, he treated the stone in his furnace. Instead of getting gold, he obtained a mass of fused matter shining in the dark. This became famous under the name of Bologna phosphorus. The stone was the well known fluor spar, which, when acted on by carbon, yielded barium sulphide, a compound of considerable phosphorescent property. In 1663 Boyle published some observations on the phosphorescence of the diamond, and in 1875 Baudouin obtained another phosphorescent product by the action of heat on calcium nitrate. Becaria added some new facts to this subject in 1744 and in

1761 Canton made the discovery of the phosphorus and pyrophosphorus bearing his name. It is made by calcining oyster shells with sulphur, and consists essentially of calcium sulphide, which is the most remarkable of phosphorescent substances. In 1775 Wilson published some valuable discoveries on the same topic. He extended the lists of phosphorics and showed that lights of various colors could be obtained from them, and made very interesting observations on the effects of heat and cold on the substance. But the greatest scientist on this particular point was Mr. Edmond Becquerel, who for more than thirty years has enriched science by his discoveries. To him is due the instrument called Phosphoscope, by which the phosphorescent power in bodies can be detected. He proved that this power is very common in nature as well as artificial substances, inorganic and organic, and particularly fluorescent compounds, etc. He analyzed the light emitted from each by the spectrum, and determined its duration with accuracy. The durations range from the 5000th part of a second to hours and even days. Of all phosphorescent bodies the sulphides of calcium, barium and strontium are the most remarkable in regard to the duration of their light. Becquerel had studied the modes of preparing these compounds, and revealed many strange, even startling facts in regard to them. They can be prepared by the action of carbon on the sulphates of sulphur on the oxides and carbonates of alkaline sulphides, and even on the antimony sulphide, on all the oxides and carbonates. The phosphori prepared by these various processes differ widely in regard to the color and duration of the light which they emit. Shades, for example, from orange and red and indigo blue, can be obtained from calcium. Becquerel holds that fluorescence and phosphorescence are one and the same phenomena; the apparent difference being due solely to the different period during which the absorbed light is emitted. M. Balmain, an excellent chemist, having enjoyed the friendship of Messrs. Becquerel, father and son, and possibly aided by them, made for many years a special study of phosphorescent substances, and succeeded in producing a constant and very powerful luminous substance; specially after it had been submitted to the exposure of magnesium light. It occurred to him to produce combined phosphorescent materials, mixed with water soil, as paints applicable to the ordinary way on any surface. The process having passed by transfer from M. Balmain to Messrs. Irie and Home. Practical applications have been made satisfactorily of it.

Vegetable Colors.

Before the discovery of the aniline black, nutgall and campeachy were the only products giving blacks of some solidity. The *hemateine* subjected to oxidizing action, takes a violet tint in combination with the *hemateine* found in the dye, such are the names given to the double effects producing the color. Campeachy or logwood acts on cotton same bine shade, similar to the blue in vat. Acetate of copper in the bath completes the blue-black. For simple black, pyrolignite of iron is sufficient. The printing black, the bichromate of potash, fixes the campeachy.

The campeachy greys are obtained by reducing the coloring dose and in passing in a bath of bichromate of potash and sal soda.

The *Bresiline* is the coloring principle of the *Cesalpinas*, Brazilian woods called *Sapan*, *Lima*, *St. Martha*. These extracts are only used for calico printing,—red, pink, etc.

The *Bresiline* gives, by being combined with iron and alumina mordants, some shades similar to those obtained from madder. Violets, with the salts of iron; reds, with the salts of alumina, and browns by mixing them together.

For woollen goods the *barwood* and *santal*, of the *Pterocarpus* tribe, give the sautaine extract which is used for the ground of tissues intended for subsequent indigo dyes. Turkey red is sometimes limited on cotton yarn with *barwood*, which produces an orange red, which can be shaded deeper if necessary.

Cochineal is still in use for wool and silk by associating cream of tartar, alum, etc. It is also yet applied for steam reds and pinks on calico. *Quercitron* and *flavine* extracts, by sulphuric acid, also are dyed well on mixed tissues of wool and cotton, in using alum and cream of tartar as mordants. Wool is dyed yellow by the yellow wood of *morus tinctorius*; the *fustet* of *rhus cotinus* and the *gaude*, *reseda luteola* give, olive by alum as a mordant.

Persian seeds are used for greens and yellows. The yellow is obtained from a fresh decoction with sulphate of alumina; the green, with ferrocyanate of pewter. *Cachou* furnishes cheap browns; it is applied by vaporization with the oxidizing agents and in passing through bichromate of potash or sal soda, developing the affinity of the *cachou* for oxygen. In fact the vegetable matters,—as tannin, nutgalls, sumac, extract of walnut, divi-divi and cactus, are in great use at present. By astringents the aniline colors are applied on cotton, and the astringents used in the blacks for silk, especially since it has become a fashion of overloading fibres with foreign substances, such as oxides of iron and tannates, which are forced sometimes on silk to the extent of 400%.

Tartar blacks.—Blacks from tartar mordants are yet the most satisfactory. They are obtained by two baths; one for the mordant and one for the dye. The process is as follows: for 200 pounds of light or heavy cloth; tartar, 15 kilos; copperas, 5 kilos; sulphate of copper, 3; dry extract of campeachy, 5; sumac redon, 5; extract of yellow-wood 800. Boil 4 hour for the light cloth; 1 hour for the heavy. Cool out over night and rinse next day. After a good draining, re-enter for 1 hour in a bath made of 5% campeachy at 40° and raise to boiling.

The ingredients must not be put in bath indifferently. The tartar must be finely ground or previously dissolved, also the copperas and the sulphate of copper separately. The bath must never be prepared in advance, otherwise deposits of lacs may take place and cause irregularities in the dye. Another good rule is to put a handful of slacked lime, chalk or carbonate of soda in the bath to secure a good diffusion and a proper scum.—*Teinturier Pratique*.

New Coloring Matters.

An acid brown has made its appearance in the market. As its name implies, it is an acid coloring, having the great advantage of being able to be dyed on wool in an acid bath, and therefore capable of being used in connection with other colors which require an acid for dyeing wool. With carmine of indigo, oranges, yellows, and other colors it may thus be associated, producing a great variety of shades. It is used exactly in the same way as acid magenta. There is some probability that this color may be largely adopted for wool dyeing.

Reducible Blue Black, by M. Collin.—According to our contemporary *Le Moniteur de la Teinture* this new coloring matter deserves the most serious attention from all wool dyers. It is insoluble in water, but like indigo it is capable of being reduced to a soluble compound and thus applied to the fibre, being afterwards fixed by oxidation in the air. It has the great advantage over indigo of a considerable economy (about 35 per cent.) while being it is asserted quite as fast. The dyeing is performed in a covered or closed vat, which is prepared in the following manner:

For 100 lbs. Wool.—Put in a wooden or metallic vat, heated by a steam coil, about 300 gallons of slightly acidulated water, which is heated to the boll from the beginning of the operation. In the meantime grind 5 lbs. of the coloring matter very finely, with 16 lbs. to 20 lbs. of zinc dust, and make into a paste with some water. When the water is boiling in the vat this mixture is added, and the whole boiled for half an hour. Next sulphuric acid in the proportion of one part acid to fifteen parts of zinc dust is mixed with cold water and added to the vat; after a quarter of an hour the bath becomes yellow, but it must be of a greenish and not of a bluish tint, because in the latter case it would show that the reaction is not complete. When the reduction is at an end, which is indicated by the greenish yellow color of the bath, the wool is entered and it is left to boil, entirely out of contact with the air, from three to four hours, according to the depth of shade required; after four hours a blue black ought to be obtained. When small patterns, taken out, washed, and exposed to the air (which develops the color) show that the required depth of shade has been attained, the wool is lifted out of the vat, pressed, and exposed to the action of air, which oxidizes the reduced coloring matter, and thus fixes it on the fibre in an insoluble state. It is afterwards rinsed, the wash-water being collected and left to settle, when the dye which has not been fixed on the fibre and which separates by washing, can be collected, dried and used again. In case the color obtained should be of a violet hue, then it is necessary to brighten it in fresh acidulated bath. As the dye vat is perfectly neutral, or very slightly acid, the fibres can without injury undergo a prolonged boiling. The vat can be used again by adding a fresh quantity of color, zinc dust and acid in proportion to the amount of coloring matter used up in the first dyeing.

The grinding of the color is of very great importance, otherwise it will not be reduced by the hydrogen, which reacts very rapidly. By doubling or tripling the quantity of zinc dust and acid the operation can be considerably shortened.—*Textile Manufacturer.*

On Mineral Colors.

Since the discovery of those mineral colors which we derive from cor-al, the old time mineral substantive colors have been more or less left out of sight. We deem it but justice to a system of permanent colors, which has done good and faithful duty in its day, to recall its merits to memory. In Dr. Bancroft's learned and admirable disquisition on the philosophy of permanent colors, he says:

"Each of the metals and semi-metals is capable, when dissolved, of becoming a basis or mordant for fixing and modifying some at least of the different adjective animal or vegetable coloring matters, with more or less advantage by dyeing. But besides this property, which will be made a subject of future consideration, several metals and semi-metals afford colored solutions or oxides, which are capable of being united and fixed directly in the fibres of linen, cotton, silk or wool, and of thereby producing various permanent substantive colors. It is indeed true, that hitherto but few metallic preparations, excepting those of iron and copper, have been used in this way or for this purpose; I mean that of giving substantive colors.

IRON.

"This, by whatever means dissolved, possesses so much affinity to linen and cotton, that when applied to them, its oxide or calx

decomposes and fixes itself permanently in their fibres, and thereby produces colors, differing considerably from each other according to the different states in which the oxide may have been applied, particularly in respect of the portion of oxygen combined with it. But as the oxide of iron, in all states and however obtained, is disposed to attract the oxygen of the atmosphere, its different colors, by this addition, soon lose their peculiar shades or variations, and acquire the rusty color commonly called iron mould. This addition, moreover, soon renders the oxide in some degree corrosive, and joined perhaps to the rigidity which it occasions by a sort of concretion in the fibres of wool, silk, cotton and linen, it disposes them to become brittle or less durable. There are few, if any, who have not observed instances of this effect from spots of what is called iron mould on linens, etc., which produce holes long before any occur in other places. But where iron is used in dyeing, merely as the basis of animal or vegetable coloring matters, these last, by combining with its particles, lessen their disposition to attract oxygen, and by keeping them farther asunder so far prevent their concretion as in a considerable degree to obviate the rottenness in question; though there is but too much reason to fear that even in this way stuffs dyed with a ferruginous basis or mordant are less durable from that circumstance; and it probably is from the use of this metal that the rottenness so generally complained of as accompanying the black dye principally results.

"But in this place I am only to notice the use of iron as affording substantive colors; and for these its use is confined to linens and cottons, to which its oxide is very frequently applied, topically, in calico printing, to produce partial buff, or rusty yellow, stains or figures, and, in general dyeing, to produce imitations of the nankin brown, as well as a considerable variety of buff colors; for all which purposes the solutions of iron by vegetable acids are preferred, as being least corrosive and therefore least hurtful to the fibres of linen and cotton.

"Among the vegetable acids, that of vinegar or alegar was for a long time almost exclusively employed to dissolve iron, and make that preparation which has been commonly denominated iron liquor (acetate of iron). But within a few years another acid has been very frequently substituted for the former, viz: the pyroligneous, distilled from wood. M. Chaptal justly considers this as being truly an acetic acid, in combination with a portion of empyreumatic oil, which, instead of diminishing, increases its utility for most of the purposes of dyeing, and especially for that of dissolving iron; and when so dissolved its oxide may be obtained at different degrees of oxidation, but its union with the fibres of linen and cotton, and the colors thence resulting are most permanent when the oxidation is greatest. M. Chaptal has however discovered that the various buff and the imitations of nankin colors, may be greatly improved by combining the oxide of iron with alumine, or the earth of alum; and for this purpose he first impregnates the cotton with the oxide of iron, by working it sufficiently and equally in a solution of that metal by the pyroligneous or other vegetable acids, or, in default of these, in a solution of the sulphate of iron, marking 3° on the areometre of Beaumé, and, after wringing it properly, plunges the cotton immediately into a solution of potash marking 2°, with which

a saturated solution of alum has been just mixed, but so as not to precipitate the alumine. By this last mixture the color of the oxide of iron is considerably raised, and it also acquires an agreeable, smooth, even and soft appearance like velvet, which could never be produced with the oxide of iron unmixed; it has, moreover, the advantage of preserving the fibres of cotton from injury by the solution of iron. After being thus immersed five or six hours the cotton is to be properly wrung, washed and dried; and by the last part of this operation it will generally become deeper from an accession of oxygen. M. Chaptal distinguishes the varieties of color dyed in this way, by the names of nankin, chamois, noisette, et rouille. (*Ann. de Chim.* tom. 26, p. 270).

"The application of potash conjointly with an oxide of iron, but without alum, for dyeing the colors before mentioned, has been practiced, particularly at Manchester, for almost half a century. But for this purpose a solution of iron by aquafortis was commonly employed, though injudiciously, as it certainly contributed more than any other to hurt the fibres of the linen or cotton dyed therewith. All these colors, though in other respects very durable, are liable to be spotted and made black by being accidentally wetted with a little tea, or with the juices, or infusions of a great number of vegetable and some animal matters, which are capable, as will be hereafter noticed, of producing an ink with iron.

"For topical application by the pencil or block, Hausman recommends Stahl's alkaline tincture of iron, made by dissolving that metal in aquafortis, and adding to it carbonate of potash in excess sufficient to decompose and re-dissolve the nitrous oxide of iron, and afterwards thickening the solution with gum, etc., as usual. Commonly, however, a solution of iron by some of the vegetable acids, called iron liquor, is employed for this purpose, adding to it a portion of sulphate of iron to increase its strength when very full and deep stains are required.

"Iron dissolved by muriatic acid assumes a greenish color, and the solution being applied to linen or cotton, the oxide adheres permanently, and by an accession of oxygen affords a fine yellow stain. A single washing will, however, so far affect the proportions on which this color depends, as to reduce it to the common iron-mould color.

COPPER.

"Only two oxides or compounds of this metal with oxygen are known to exist; one of these, naturally formed, is distinguished by the name of ruby copper ore. Its color is a dark or brownish red, though the artificial imitations of it have, I believe, never risen much above an orange color. This native oxide is supposed to contain about eleven per cent. of oxygen; but neither it nor any artificial imitation of it has yet, as I believe, been employed for a substantive color in dyeing or calico printing. I, however, very recently and unexpectedly produced, and fixed permanently upon calico, a brownish red oxide of copper, very nearly resembling the ruby copper ore in color. It has withstood repeated washings with soap and six weeks' exposure to the weather without alteration, and may, I think, prove useful by simple topical application in calico printing; but in this instance it was the result of a complicated mixture made for another purpose, and I have not yet had time to simplify

the process sufficiently. When I shall have done so, I intend to make it public. In appearance it resembles another very permanent color, which I discovered twenty years ago. I mean the red prussiate of copper, to be mentioned hereafter.

"The other oxide of copper is supposed to contain about twenty per cent. of oxygen; but it has never, I believe, been employed for dyeing or calico printing.

"The green color exhibited by most of the preparations of copper, commonly results from the absorption or addition of carbonic acid, for which the oxides of copper have a marked affinity; it may be produced also by the admixture of muriatic and some other acids. There is, however, I believe, none of the acid green solutions of copper or its oxides, which after being applied simply to cotton or linen will bear to be washed with soap, though their colors generally withstand the impressions of sun and air for a considerable time. But if liquid ammonia be saturated with copper and thickened with gum, it may, by simple topical application, be fixed upon linen or cotton, where, by an evaporation of a part at least of the volatile alkali, and an absorption probably of both oxygen and carbonic acid, its blue color will be changed to a green, resembling that of verdigris, or rather that of the malachite, which will very sufficiently resist the impressions of sun and air, and bear a considerable number of washings with soap without being much weakened thereby. It may, therefore, be usefully employed in this way, especially upon fine muslins, by reason of the great delicacy of its color and the facility of its application. I have several times thought that an effect somewhat better had resulted, when, instead of dissolving the copper by ammonia, I combined the latter with a nitrate of that metal. Verdigris dissolved by ammonia also produces good effects used in this manner. A similar beautiful, though pale green, may be substitutively dyed upon woolen cloth, by the sulphate of copper with a sufficient portion of carbonate of lime to neutralize the acid. This color will not indeed bear the action of soap, but it does not appear to suffer any considerable change or diminution by the impressions of sun and air for a long time.

The oxides and solutions of copper are all susceptible of combination with most of the adjective coloring matters, and may be usefully employed as mordants or bases with some of them, which will be duly noticed hereafter.

RED COLORING MATTER.—M. G. Fisher has found, that by the oxidation of ortho-amido-phenols, oxidized by ferricyanide of potassium, a red coloring matter is obtained that can be purified by sublimation. It forms garnet-red acedles which sublime without melting at 211°. It is scarcely soluble in water, and with difficulty in alcohol or ether. It has a green effluorescence and possesses feeble basic properties; it dissolves in acids with a blue or deep violet color.

THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY has favored us with a circular with reference to the International Exhibition of sheep and wool products to be held in the Main Centennial Building, Fairmount Park, in September next. As we would desire to see the dyeing interest represented in a special department, we will speak of the subject in full in our May issue.

TEXTILE COLORIST.

Dr. M. FRANK, Manager.

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SPECIAL NOTICE TO OUR PATRONS.

{ OFFICE OF THE TEXTILE COLORIST,
Philadelphia, March 31st, 1880.

We have of late received many complaints from parties who stated that, although they had paid their subscription to our authorized agent, they failed to receive their papers. It becomes our unpleasant duty, therefore to state the following facts:

Putting entire confidence in the integrity of Mr. Max Oescher, we appointed him our general agent for the Eastern States about a year ago, and shortly after commissioned him our general agent to represent us in Europe, with power to receive payment for subscriptions and advertisements. On his return to this country we appointed him our general agent for the Eastern States, still reposing confidence in his honesty. But we find that we have been completely deceived by our said agent, and hereby give notice to our patrons that the said Max Oescher is no longer in our employ for any purpose whatsoever.

Those persons known to us who have paid this man (Oescher) will have their papers duly sent them; and those who do not receive their papers will please communicate with this office at once.

Dr. M. FRANK, Manager.

THE GREAT ANTIQUITY of the art of dyeing ought certainly to be a source of pride to those who follow it, and the proofs of that antiquity are numerous and indubitable. Thus, we find in the Scriptures (37 chapter of Genesis), that Jacob "loved Joseph more than all his children, because he was the son of his old age; and he made him a coat of colors." Need we go back further than that?

That dyeing was always an admired and well-studied art we find innumerable proofs in ancient history; and that it never lost its hold upon the minds of the people is fully exemplified in modern history, down to our own day.

The greatest minds this world has ever seen have yielded to the taste for colors, and again, the most savage people in all ages have been possessed of this taste. Nature itself revels in it, and the rainbow, in its prismatic glory, spans the world with colors that give inspiration to our dyers.

What a lesson does the Indian in his savage state teach us in this one great decorative art. Without the slightest of our educa-

tionary aids he goes at once to Nature, and by a special, inexplicable instinct, procures rich and permanent dyes from the juices of her plants wherewith to decorate his person. For, vanity and love of admiration are as inherent in him of the plains, as in his more civilized brother of the cities. And this is an attribute of man's nature, be he polished or rough, which will never die out, nay, it will grow with the extension of science while the world lasts.

Analytical chemistry is doing much in the way of discovery, but the work was being done for ages by the barbarians in his own rude, yet not ineffective way. His was practice rather than theory, for, although he sometimes produced rich colors, he never studied out the reason of his success. It was enough in his mind to have discovered and produced by his own means—the why and wherefore he did not trouble himself about.

But, although from time immemorial, this vegetable dye process has been going on, it is due to chemistry, to say that it might have continued to this day confined to a few colors, were it not for the untiring efforts of the great science to which we owe the ever-increasing beauties of colors and their never ending tints and shades. It is the interest of the dyer to work with the chemist, in order to bring forth in its full glory the capability of his art.

It is a matter for consideration by our dyers and manufacturers of dyes, why it would not be advisable to start a national exhibition of dyed textiles. Surely it must be evident to every one concerned that this would be a most judicious mode of drawing the attention of the public in general to an art so beautiful, and even if they had to join in with another exhibition and become a department of it, how much better would it be than continuing the present hole-and-corner system. Let us have open competition, and let the best win. Such competition is most desirable in an open exposition, and with the public as judges. We have annual fine-art exhibitions in all our cities, and why not have a yearly national exposition of the dyer's art?

What we mean by introducing the word "national" is a gathering of the works of the textile dyers of each and every part of the United States into one exhibition, to be held each year in certain designated cities.

We would certainly favor an exposition of the dyer's art exclusively, in preference to coalition with any other display, because the public attention would not then be diverted from the one object, namely—dyeing. Whereas, if there were also an exhibition of, say textile manufacturers, the eye of observation would give perhaps an undue share of attention, to the obvious neglect of that which should have its fair portion of credit. There is an ample amount of dyeing work done throughout the country to make up an exposition which would be not alone creditable to manufacturers and dyers, but be profitable in the public attention it would be sure to draw, and the taste it could not fail to create.

The continuation of Dr. H. Eudemann's article on the "Description of Dyestuffs and Determination of their Commercial Value," not having reached us in time for this issue, we are compelled to postpone it.

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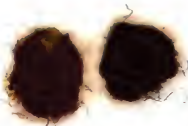
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PRICES CURRENT.

PHILADELPHIA, APRIL, 1880.

DYES AND DYE-STUFFS.

Acetic Acid.....	per lb.	\$	6	6	8
Albamen, Blood.....	do	50	60	85	
Albamen, Egg.....	do	25	25	02 1/2	
Alum, ground.....	do	25	25	02 1/2	
Alum, lump.....	do	25	25	02 1/2	
Annatto, prime.....	do	1	1	30	1 50
Aniline Oil, English.....	do	20	30	30	
Aniline Oil, French.....	do	25	35	35	
Aniline Salt, crystals.....	do	35	35	30	
Aniline Salt, cake.....	do	16	16	22	
Archil Liquid, best.....	do	7	10	10	
Argols, crude Oporto.....	do	16	20	30	
Argols, crude Sicily.....	do	28	30	33	
Argols, refined St. Ant. Brown.....	do	28	32		
Argols, refined Light.....	do	5	6		
Aqua Ammonia.....	do	5	6		
Aqua Ammonia, F. F. F. P.....	do	75	90		
Aurifer.....	do	5	5		
Barbery Root.....	do	14	17		
Barwood.....	do	10	13		
Bichromate Potash.....	do	10	13		
Bleaching Powder.....	do	10	13		
Borax, refined.....	do	10	13		
Brass Wood.....	do	10	13		
Blue Vitriol.....	do	10	13		
Brimstone, roll.....	do	10	13		
Canwood, pure.....	do	10	13		
Canwood, No. 1.....	do	10	13		
Carbonate of Ammonia.....	do	10	13		
Cautic Soda, 50 per cent.....	do	10	13		
Cautic Soda, 70 per cent and over.....	do	10	13		
China Clay.....	do	10	13		
Citric Acid.....	do	10	13		
Cochineal, Honduras.....	do	10	13		
Cochineal, Mexican.....	do	10	13		
Cochineal, Black Teneriffe.....	do	10	13		
Copper.....	do	10	13		
Cream Tartar, crystals.....	do	10	13		
Cream Tartar, powdered.....	do	10	13		
Crimson Spirils.....	do	10	13		
Cudbear, pure.....	do	10	13		
Cudbear, No. 1.....	do	10	13		
Cudbear, No. 1, French.....	do	10	13		
Cutch.....	do	10	13		
Devil Dye.....	do	10	13		
Dipping Acid.....	do	10	13		
Extract Fustic.....	do	10	13		
Extract Hyperic.....	do	10	13		
Extract Indigo.....	do	10	13		
Extract Logwood, bulk.....	do	10	13		
Extract Quercitron.....	do	10	13		
Evantine.....	do	10	13		
Fustic, Ceylon.....	do	10	13		
Fustic, Maricao.....	do	10	13		
Fustic, Samarra.....	do	10	13		
Gambler, bales.....	do	10	13		
Glauber Salt.....	do	10	13		
Green Ebony.....	do	10	13		
Hyperic.....	do	10	13		
Irish Moss.....	do	10	13		
Iron Nitrate.....	do	10	13		
Indigo, Auxiliary.....	do	10	13		
Indigo, Bengal.....	do	10	13		
Indigo, Caracass, fine.....	do	10	13		
Indigo, Gautamnia, fine.....	do	10	13		
Indigo, Madras, fine.....	do	10	13		
Indigo, Manila.....	do	10	13		
Lac Dye, fine powdered.....	do	10	13		
Lac Dye, good powdered.....	do	10	13		
Lima Wood.....	do	10	13		
Logwood, Campeachy.....	do	10	13		
Logwood, Honduras.....	do	10	13		
Logwood, Laguna.....	do	10	13		
Logwood, St. Domingo.....	do	10	13		
Madder, Dutch.....	do	10	13		
Madder, French.....	do	10	13		
Marble Bark.....	do	10	13		
Marble Dust.....	do	10	13		

Myrabolans.....	per lb.	\$	5	5	6
Muriate Acid.....	do	11	11	23	
Muriate Tlb.....	do	19	19	22	
Muriate Tin, strong.....	do	19	19	24	
Muriate Tin, oxy.....	do	21	21	24	
Muriate Tin, crystals.....	do	21	21	24	
Newwood.....	do	7	7	8	
Nitrate Iron, pure.....	do	11	11	12	
Nitrate Lead.....	do	11	11	12	
Nitric Acid.....	do	26	26	28	
Orange Oil.....	do	16	16	22	
Oxalic Acid.....	do	10	10	11	
Pearl Ashes.....	do	5	5	7	
Perian Berber.....	do	25	25	28	
Picric Acid.....	do	45	45	46	
Potashes.....	do	27	27	31	
Prussiate Potash, yellow.....	do	65	65	70	
Prussiate Potash, red.....	do	13	13	2	
Quercitron.....	do	24	24	23	
Redwood.....	do	18	18	20	
Red Sanders.....	do	6	6	6	
Salts of Soda.....	do	6	6	9	
Starch, Corn.....	do	6	6	6	
Starch, Potato.....	do	6	6	6	
Starch, Wheat.....	do	6	6	6	
Safflower.....	do	24	24	40	
Safflower extract.....	per bot.	4	4	50	50
Salt Ammoniac.....	do	12	12	13	
Salt Soda.....	do	11	11	2	
Sapwood, ground.....	do	60	60	80	
Soluble Blue.....	do	104	104	11	
Sugar Lead, brown.....	do	22	22	24	
Sugar Lead, white.....	do	52	52	55	
Sumac, Sicily, according to grade.....	do	52	52	55	
Sumac, Va.....	do	52	52	55	
Soda Ash.....	per lb.	2	2	23	
Sulphuric Acid.....	do	11	11	23	
Tartaric Acid.....	do	5	5	6	
Terra Japonica.....	do	4	4	5	
Turneric.....	do	7	7	8	
Ultramarine.....	do	13	13	25	
Verdigris.....	do	20	20	32	
Wood.....	do	10	10	12	

BUSINESS OPPORTUNITIES.

F. J. BIRD, AUTHOR OF THE DYERS' HAND BOOK, is prepared to furnish reliable regions in any branch of dyeing, and will have pleasure in supplying in any color or shade for special customers, of his new Aniline Colors. See advertisement, page 8.

Address, 212 N. 7th St., Brooklyn, N. Y.

DR. STEVENSON MACADAM, in a paper read before the Scottish Society of Arts, on Coal-Tar Colors and their application to textile fabrics, stated that the annual value of these colors now manufactured exceeded three millions sterling (fifteen millions dollars).

RECIPE FOR ANILINE BLACK.—It is stated that Dr. Hellmeier obtains a very good white by printing a reserve composed of 48 kilos. white arsenic dissolved hot in 4 litres caustic soda (1-32/8 sp. gr.) and 4 litres water; and, when cold, mixed with cold water till it shows 1-7047 sp. gr. Of this clear solution 3-2 litres are diluted with 9 litres water, and thickened with 5 kilos. dextrine.

THE long winded nomenclature of chemistry is a nuisance that ought to be abated, (if possible), but as yet there seems to be no short cut out of the difficulty. It is to be hoped that the inventive genius of some philanthropist will yet save the alphabet from this terrible tax upon its endurance; not to say anything of the patience involved in the oral effort to pronounce those elocuted monstrosities. Reform is demanded and must come, or lunatic asylums be greatly increased. Let any man, with as much time as he likes, undertake to try through this: *Diamidazoxyphenolene Hydrochlorate*; *Pyrogallotriglycollic Acid*; or *Azotolphenolbenzophenylchlorglucin*; *Naphthylmethylanilolphenylsulphon*. Ah, there, we are out of breath; and surely our readers are out of patience.

(Continued from page 82.)

3d bath 1 Gall Yellow Spirits, give 5 turns, wash and finish.

Yellow Spirit.

Put 2 ozs. Feathered Tin to every 1 lb. Muriatic Acid direct into the carboy, let dissolve over night, and it is ready for use in the morning.

Recipe No. 70.

GENDARME BLUE ON COTTON.

50 lbs. Yarn.

Put in 9 lbs. Sumac for 1 hour, wring and enter.

2d bath of Oxy-Muriate of Antimony 2^d T., give 7 turns, wash, enter dye bath of

4 ozs. Gendarme Blue, { E. Sehlbach & Co.,
 { N. Y., Boston and Philadelphia.

At 80° F., give 6 turns, raise temperature to 120° F. and finish.

Recipe No. 71.

LIGHT BLUE ON COTTON FLANNEL.

50 lbs. Cotton Flannel.

Dissolve 3 lbs. Alum,

3 ozs. Tartaric Acid,

1 qt. Water Blue 6 B. { Actien Gesellschaft, Berlin.
 { Henry A. Gould, Boston, N. Y., Philada.

Enter Flannel at 90° F., turn rapidly, raise temperature to 130° F., and turn to shade.

Note.—It is advisable to add first 1 qt. of Water Blue, and add balance after the cotton is even.

Recipe No. 72.

LIGHT MAROON ON COMMON BROWN MIXED CARPET YARN.

100 lbs. Yarn well scoured.

Dissolve 2 lbs. Bichromate of Potash.

Enter boiling hot and turn for 1 hour, wash out, and enter at 120° F.

2nd bath of 40 lbs. Hypericic, give 7 turns and raise to boiling, then add 1 pint Oxy-Muriate of Antimony, give 5 turns, wash and finish.

Recipe No. 73.

BROWN ON COMMON BROWN MIXED CARPET YARN.

100 lbs. Yarn well scoured.

Dissolve 6 lbs. Cutch,

12 ozs. Bluestone,

Enter boiling hot and turn for 1 hour, wash out and enter 2nd bath of

30 lbs. Logwood, ground,

at 120° F., give 7 turns while raising temperature to boil, and boil for 1 hour, then add 1 quart Oxy-Muriate of Antimony, give 5 turns, wash and finish.

Recipe No. 74.

PIUTEUX BLUE ON ALL WOOL FLANNEL.

25 lbs. Flannel.

Boil 1 lb. Glaubersalt,

4 ozs. Oxalic Acid,

3 ozs. Puteaux Blue, B. S., (Alexander Barril, N. Y.)

Bring to boil, cool down to 150° F., enter flannel, give six turns, raise temperature to boiling heat, and boil 1 hour, take out, cool,

add to the same bath 2 ozs. oxalic acid, enter flannel and turn for fifteen minutes, wash and enter fresh bath of

1 pint Acetic Acid,

turn for about 10 minutes, wash and finish.

Note.—For darker shades pass first through a bath of

4 ozs. Bichromate of Potash,

2 lbs. Glaubersalt.

☐ This blue is claimed to be fast to air, sun, and soap. We will make several tests ere long, and report more fully.

Puteaux Blue on Flannel.

This product is a substitute for indigo on wool. It is extensively used in Europe. The following is the direction received from Mr. Alexander Barril, Agent, New York.

MANNER OF USING THE SOLID BLUES FOR DYEING WOOL IN PIECE OR IN SKEINS.

A. The dyeing must be done in wooden tanks, or of stone, not calcareous (the use of copper to be avoided under all circumstances), the steam pipe used in the tank must be either of lead or stone, not calcareous.

B. 1st. Put in the tank holding the water where the dyeing is to be effected—Oxalic Acid—3% of the weight of the wool—then boil for fifteen minutes. 2d. Stop the boiling and add—Common Ammonia—4 @ 5% of the weight of the wool. Coloring 10% for the first bath. 3d. Then immerse the fabric, and boil for three-quarters of an hour. The bath should then be of a light violet color and dye very lightly. 4th. Add Oxalic Acid 3 @ 4%: The liquid will then immediately turn blue, and dye in an hour and a half. The dyeing can be hurried by adding from 1 @ 2% Oxalic or Acetic Acid.

C. The dyeing liquid in the tanks may be used indefinitely, provided the ingredients and coloring matter exhausted by the preceding dyeing be renewed as follows:

Ammonia 4 @ 5%.

Color X—According to shade required.

The liquid returns to a light violet color, then put in the stuff to be dyed and boil three-quarters of an hour: Add Oxalic Acid, 3 @ 4%, and continue as above. The same will hold good for the following:

D. After the dyeing put the fabric in water, and leave it for fifteen minutes in a bath @ 50° C., containing:

Acetate, Sulphate, or Chloride of Zinc 4%.

Acetic Acid, Sulphuric or Chloric Acid. 2%.

Then wash as usual. This operation will prevent any after change in shade. When the wool must be fulled after dyeing, change the preceding operation by putting it for ten or twenty minutes to boil, in a bath of

Nut-Galls, (pulverized) 3 @ 4%.

Acetic Acid 1 @ 2%.

These baths are always good for use, provided that after each steeping of the wool, the half of the ingredients are added to it.

Observations.—The dyeing process should always commence with a violet bath, and finish with a blue one. Should the bath precipitate in consequence of an excess of acid, it can be restored by adding ammonia. The fabric will not take a fast color unless the bath be limpid and blue, that is to say, lightly acid. The quantity of ammonia should always be proportionate to the weight of oxalic acid previously put in the bath. For 100 Oxalic Acid, put at least 125 Ammonia at 22° C. The Salts of Copper tarnish the blue; the use of copper vessels should be avoided in all the operations.

NOTES OF THE MONTH.

All communications under this head will meet with due attention, and coloring matters will be fairly tested.

MESSEURS. ANDREYKOVICH & DUNK, Dealers in Anilines, Dye-stuffs, and Chemicals, will remove about the 1st of May, from 106 North Front Street, to their commodious buildings 58 and 60 North Front Street, Philadelphia, Pa.

MESSERS. E. OAKES & Co., New York, will remove about the 1st of May from 34 Dey Street, to their new warehouse, 41 Dey St.

WE HAVE received from Henry A. Gould, Boston, Mass., a new product of the Actien Gesellschaft, Berlin, called Naerast S, it is intended for chamois on wool, and requires only sulphuric acid for mordant. We will bring sample soon in our practical department.

A TEXTILE DIRECTORY.—The importance and magnitude daily increasing, of the Philadelphia textile industries, constantly manifest themselves by new facts. After the formation of a Textile Manufacturer's Association, and of technical publications, the TEXTILE COLORIST, and the TEXTILE MANUFACTURER, there comes a Textile Directory. Hon. Lorin Blodget is now preparing a complete list of all the textile manufacturers in Philadelphia and vicinity, with tabulated data thereon. It will be published in a quarto volume of 62 pages, containing all particulars regarding locality, power, machinery, and specialties of each establishment. Mr. Lorin Blodget being the author of several works of the same character, such as his reliable statistical book, *The Industries of Philadelphia*, published in 1877, this new compilation of the textile manufacturers, will no doubt be a useful and commendable volume. The dyeing establishments are to be tabulated in it. The Printing House of Collins & Co., 705 Jayne Street, Philadelphia, will shortly publish this book. Price, \$5.00.

FIXING COLORS ON TISSUE.—According to the *Textile de Lyon*, the finishing part of dyed cloth is now modified by a perforated cylinder turning in hot water and agitated by a steam jet. The steam jet operates inside of the cylinder while the tissue rolls on it. The double action of this pressure inside, and of the pressure by the water outside, penetrates so as to give a better fixity to the dye on the goods.

NEW DRYING SYSTEM FOR COTTON YARNS.—The new contrivance of M. E. Dollander for sizing and drying yarns, has been recommended by the Mulhouse Industrial Society for the following merits: The ordinary drum is suppressed and replaced by hollow metallic boxes, heated by steam and forming a continuous surface of radiation. The yarns run around it without contact. The drying is done by radiation and ventilation. The drying boxes being engaged into a closed wooden frame, a ventilating apparatus drives the moisture while combining the evaporation with the heat radiation. It is only after a certain degree of dryness that the yarns are allowed to be in contact with the heated surface of the metallic boxes. The advantage of this system is that the threads are not flattened nor rendered brittle by the sort of rapid cooking heretofore

resulting from a direct contact of the wet size with the hot drum. Several establishments having adopted this new system, have testified to its superiority in quality and economy of the products. Mr. Dollander obtained the award medal offered in competition for such improvements in the sizing and finishing of cotton and wool yarns.

ATOMIZING SIZES.—M. G. Knappe, of Saxony, having observed that goods are frequently inferior from the irregularity of the sizing distribution on the surface of the tissue, has contrived an apparatus by which this distribution is made uniform and even on the cloth. This system consists in using compressed air as a distributing agent. Several pipes discharge compressed air on a stream of sizing liquid, while the cloth is passing slowly through the sizing box. It atomizes it so well that it penetrates the tissue readily and regularly.

A NON-POISONOUS MORDANT.—1 k. wine yeast is evaporated with 4 gr. tartrate of soda; 15 gr. glue and 10 gr. tannic acid are added to the thick boiling mass. It is used by dissolving it in a decoction of soap root and dye in water, for woollen goods; without soap root for silk dyeing.

SILICIOUS COLORING MATTER.—From minute studies recently made by M. G. Engel in France, the silicious elements of the earth would be animal and not mineral compounds, as heretofore admitted. Moreover, these silicious constituents have coloring and mordanting properties for dyeing vegetable and animal fibres, on account of their great atomic affinity for molecules or fibrous cells, as if naturally belonging to them. M. Engel has recognized in the sand called silica various species of tubular infusoria crystallized. 'White sand is formed of animal fragments of the annular tribe; some had yet fifteen rings attached together as a partial carapace or shell. The capillarity of these molecules is such that it takes any color either from nature or from artificial application. Besides the curious fact that the world is of a pure pre-existing animal composition, these observations tend to prove that dyeing is not essentially produced by a chemical combination with the fibrous matter, but by a simple capillary attraction of cells for active atoms. This microscopic study is leading to the plausible theory that nature is a compound of animal bodies inserted in each other.

ERICINE.—This new dye is extracted from poplar wood. Stems of common heath are heated with a hot solution of alum and the wood of different varieties of poplar.

LUMINOUS DRESS GOODS.—The Balmian luminous paint is now in practical and powerful hands in London. It will no doubt culminate in a final success. Various experiments made on walls, on life buoys, on carriage tops, on signs, and on dress suits for divers in the sea, have been successful and so satisfactory that the industry of luminous paint seems to be a virtual fact. Now, since this luminous paint is applied on tissue as well as on hard surface with a paint brush, we see no reason why the regular calico printing could not adapt it as well as any other coloring matter. We suggest to our enterprising printers to study the idea and to patent it as promptly as possible. Let everybody be a permanent external luminary.

PHOSPHORESCENT COLORING MATTER.—A recent patent in France for a luminous powder gives the following constituents of the article. 100 parts of calcium carbonate and phosphate obtained by the calcination of shells, are mixed with 100 parts of quicklime. To this mixture 25 parts of calcined salts, 50 per cent. of sulphur and 7 per cent. of sulphides of calcium, barium, strontium, magnesium, and uranium are added. After due exposure to sunlight, this compound will phosphoresce. An incineration of sea algae added to it increases the effect. One of the patentees is M. Talleyrand Perigord de Sagan, Paris.

OUR TABLE.

We have received parts 1, 2 and 3 of the *Lexicon der Färbwaren-und Chemikalien-kunde*, a practical hand-book of chemical science applied to dyeing, in which is embraced a full and complete compend of tests of all useful dyes, dyestuffs and chemicals used in the industries and trades. Vol. 1, which is comprised in 8 parts, treats of inorganic dyestuffs and chemicals. Vol. 2 contains organic dyestuffs and chemicals. The author of this useful and most welcome aid to the art of dyeing is Dr. Ferl. Springmuhl, the well-known editor of the *Muster Zeitung*. It is published by Gustav Weigel, Leipzig, Germany, and can be procured from all German book-sellers in this country, or at this office.

QUERIES AND REPLIES.

Under this head we invite all our friends to make their inquiries on every subject connected with dyeing, etc., and we will endeavor to give them such information in answer as they are in need of. We also invite others to give us the aid of their experience in such replies. All will be welcome.

QUERIES.

60.—Is there any rule by which the Beaume and Twaddell hydrometer scales can be figured into each other? S. S.

61.—What is a good scarlet for cotton yarn? N.

62.—I have heard there were methods formerly in use for leaving white spots on a blue colored ground which were very simple. Could you give me any information on the subject?

63.—What is lacterine? R. T.

64.—Can you inform me of a good test for hardness of water? AMICUS.

65.—I would thank you for information regarding the constituents and characteristics of picric acid?

ANSWERS.

60.—There is no rule that we know of. You must work out the assimilation for yourself; but be sure that your hydrometer scale, whether Beaume or Twaddell, be an entirely reliable one. There are very many bad ones offered for sale.

61.—A good scarlet for cotton yarn may be prepared thus: 20 lbs. sumac, boiled to form a bath; 100 lbs. bleached yarn put in it for a few hours; 10 lbs. tumeric added, and boiled for two hours. The yarn is taken out and passed through a bath of chloride of tin

of 3° B. for three-quarters of an hour; then taken out, wrung well, rinsed, and finished with 13 ozs. saffranin and 1½ lbs. tumeric.

62.—There were several modes by which this effect was produced. One was the immersion of the cloth in an alkaline solution of indigo, and was employed in dyeing those goods, the grounds of which were intended for blue or green. The parts which were meant to remain white, or which have already received some other colors, being covered with a reserve or paste, to protect them from the effect of the dye. This process is as old as it is simple. Another was employed in dyeing those goods intended to exhibit a design or pattern in one or more shades of blue upon a white ground, which was called "China blue" or "English blue," the process having originated with the calico printers of that country.

63.—It is curd of milk prepared in the dry state for calico printing. Cheese which does not contain much fat, when digested with ammonia, produces a solution capable of replacing lacterine.

64.—Try the soap test. It is a tincture of the best curd soap, made by dissolving one part of it in 75 parts of warm distilled water, and then adding an equal volume of rectified alcohol. This is not the only one that may be used, but it is convenient and keeps well if there be no acid in the alcohol. You must experiment as to the quantity of lime to be used, as the quality of the soap varies.

65.—Picric acid is of recent introduction in the tinctorial art for silks and woollens. It has no affinity for cotton. It is produced by various methods, through the agency of nitric acid upon some organic matter. The cheapest source is in the oil from coal tar, called carbolic acid. It yields by treatment a yellow crystalline powder of a very bitter taste. It is quite combustible and its mixture with potash and other bases burns like gun powder. It dissolves in warm water with a fine yellow color. It dyes wool and silk of a bright canary color, without any mordant, it being a dye and a mordant in itself. It is largely used in Lyons for silk dyeing, for which it is more valuable than for wool. It is a powerful and rich coloring matter, imparting a tinge to more than a hundred times its weight of fibre. It is too strong to work in combination with other colors; it annihilates them. It is also called *carboic acid* and *nitro-picric acid*. This last is the most suitable name.

CORRESPONDENCE.

In this department of the TEXTILE COLORIST we propose to publish all letters pertaining to the business of dyeing, bleaching, etc. But we wish to be distinctly understood that we will not hold ourselves responsible for any opinions set forth by writers.

BOWTON, APRIL 15th, 1880.

To the Editor of the Textile Colorist.

Dear Sir:—In the TEXTILE COLORIST for February, we notice Mr. F. J. Bird offers \$50 for the information where he can get an acid brown same strength and shade as Bismarck brown. We have recently received the following letter from the Clayton Aniline Co., (for whom we are the Agent in this country,) that we think will prove to be adapted to Mr. Bird's use. The following is the communication:

"Acid Brown.—This is a new dye giving same shade as Bis-

marck brown, but unlike the latter, it can be used in an acid bath. It differs from ordinary brown in the same way as acid magenta differs from ordinary magenta, and it may be employed with advantages simultaneously and in the same bath with other dyes, which require the use of acid. It is only suitable for wool, and resists the action of soap well."

We send you by mail a sample of the brown for exhibition.

Yours truly,

HENRY D. DUPEL.

Coloring Matter Found in Certain California Plants.

Professor Stillman has done a practical service to the textile art in bringing forward very interesting facts relating to the production of coloring matter, and of gums from the *Acacia Greggii*, and the *Larrea Mexicana*. In his paper, read before the California Academy of Sciences, he declared that California was abundantly able to compete with the British East Indies in supplying gum shellac, which he states exudes abundantly from the above named plants, which likewise give forth lac-dye. This latter is to be found abundantly, (according to the statement of a gentleman present on the occasion, Mr. Hedding) in various sections. To quote the gentleman: "These lac-yielding plants are as plentiful as sage-brush from Southern Utah to New Mexico, and from the Colorado Desert to Western Texas; being most abundant around stations on the Mojave and Colorado Deserts, exuding as the result of an insect sting." Now, to look at the profit to be derived from such a native product, let us say that Calcutta exports five millions of dollars worth of shellac yearly, at 25 to 35 cents per pound, and nearly as much more of lac-dye at from 30 to 40 cents per pound, and then let us look at the fact that some three or four years ago this country imported of shellac alone upwards of seven hundred thousand pounds. Is it not cause for gratulation then, that we can save future importations, and not unlikely, export the article?

The collection of these lac-yielding plants is so easy that every family can employ their children at it. The treatment is equally simple. Boiled in hot water, the gum of the twigs rises to the surface, and is skimmed off, strained, and dried on flaps or any smooth, hard-surfaced material, and then it is taken up and hand pressed and finally laid out in flakes fit for its relative uses; as varnish, sealing wax, etc. What is left in the kettle after this skimming off of the gum, as just described, is allowed to settle down to the bottom and is lac-dye. It is a very valuable discovery this, and should be followed out and thoroughly utilized.

It has been distinctly proved that the liquor, of a reddish-brown, which flows from the branches of the *Larrea Mexicana*, commonly known as the creosote plant, and is caused by the puncture of an insect, yields a red coloring matter similar to cochineal, and possessing all its attributes. So strong and disagreeable is the color of this plant, that it has obtained the name of *stink weed*, and it impregnates the air to such a degree as to be smelt at a great distance off. However, the actual intrinsic value of the plant is such as to far out-weigh any such objectionable feature.

On the Boiling of Cotton.

Cotton, in its grey state, is impregnated with resinous substances which prevent it being thoroughly wetted. These substances, in conjunction with impurities which cotton always takes in the operation of spinning, such as oily and greasy matters, render the threads unfit for dyeing, and especially for bleaching; therefore it is necessary that cotton should be boiled with alkalis (lyes), in order to eliminate all these foreign substances. Formerly cotton was boiled by means of pearl ashes, which always contain carbonate of soda or potash; but now carbonate of soda itself is always used, either as soda ash or as soda crystals. Caustic soda can also be employed, but the proportions in which it should be used are rather difficult to estimate, and the risk of tendering the fibre would always be present. A lye showing 1° B. and boiling for ten hours is sufficient to cleanse the cotton.

Linon requires fifteen to eighteen hours' treatment at the boil, while it necessitates thirty to thirty-sixty hours in the cold. The resinous matters that are present are removed by forming with the alkali a kind of soluble soap. After boiling, it is necessary to wash. Before speaking of bleaching, it will be well to pass under review the products used for boiling.

Ashes.—The ashes are composed of all fixed mineral or inorganic substances which the plants have derived from the soil, their nature varying, of course, according to the ground where the plants are developed. Sea plants, for instance, leave behind ashes containing soda derived from the common salt (chloride of sodium) dissolved in sea water. By treating ashes with water, a so-called lye is produced, which is nothing but a solution containing carbonate of soda or potash. As the latter dissolve fatty and resinous matters, we have the reason for its being used for the boiling or cleansing.

Carbonate of Soda (Soda ash) is a compound of carbonic acid with sodium oxide. The ordinary process for obtaining carbonate of soda is to calcine a mixture of 2,000 lbs. of sulphate of soda, 2,000 lbs. of carbonate of lime (chalk) and 1,000 lbs. of coal. The reaction which takes place is the following: Sulphuric acid, contained in the sulphate of soda, combines with the lime to form sulphate of lime, while the carbonic acid of the carbonate of lime combines with sodium oxide to form carbonate of soda. The carbon contained in coal reduces the sulphate of calcium to sulphide, by combining with its oxygen to form carbonic acid and carbon monoxide. It may be asked why coal is used at all, since carbonate of lime and sulphate of soda would, by themselves, give carbonate of soda and sulphate of lime. The reason is, that by treating the product with water, a double decomposition takes place in the reverse way, and sulphate of soda and carbonate of lime would be regenerated. Therefore it is necessary to get rid of the sulphate of lime; this is done by the carbon, which reduces it to a sulphide or sulphuretted of calcium. This process is due to Le Blanc. He discovered it in the following way: Before the French revolution carbonate of soda was used, which was found ready formed in the Natron of Egypt, or was obtained by leixivating the ashes of *Salsola annua*, a plant cultivated in the neighborhood of Narbonne, from which it took the name of Narbonne salt. It contained nearly fifteen per cent. of carbonate of soda. The Spanish sal-soda was also utilized, giving a product containing about thirty per cent. At the time of the wars with England and the Continental blockade, it was impossible for France to obtain soda from abroad. The French Government then offered one million francs (£40,000) to the inventor of a process to produce soda artificially with products to be found in France. Le Blanc discovered this new way of manufacturing soda, but he did not profit by his discovery and he died in the

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For the quantity of dyestuff, see Samples.

100 lbs. Material.

Boil 10 lbs. Glaubersalts,

4 " Sulphuric Acid.











Cool down to 160° F., enter the dissolved dyestuff, stir well, and then enter goods, turn rapidly while raising temperature to boiling, boil about 10 minutes, wash well and done.

100 lbs. Material.

Boil 10 lbs. Glaubersalt,

8 " Muriatic Acid.

Cool down to 160° F., enter the dissolved dyestuff, stir well, and then enter goods, turn rapidly while raising temperature to boiling, boil about 10 minutes, wash well and done.

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greatest poverty. Soda ash is always impure; this is the reason why some manufacturers have adopted caustic soda to produce their dye.

Caustic Soda.—This is obtained by treating soda ash by means of caustic lime. Carbonate of lime is precipitated, while caustic soda remains in solution. The difficulty is to know how much lime is necessary for a certain amount of soda. Experience has shown that for a soda ash of 80° 45 parts of lime are required for every 100 parts of soda used. Besides it is easy enough to ascertain when the soda carbonate is perfectly decomposed. For this purpose a small portion of the clear liquid is filtered, some clear lime water is added, and if there is a white precipitate formed, it shows that more lime is required; if no precipitate is formed, then the operation is finished. However, a small excess of lime will not be injurious. The clear solution of caustic soda is evaporated to dryness.—*Textile Manufacturer.*

More on Simultaneous Printing with Multiple Colors.

Our last edition contains an account of a new process for printing many colors in one operation. The idea is commented on in the tinctorial press, and the *Textile de Lyon* considers it as an original notion worthy of being studied by practical professionals. We find in this publication some additional remarks on the application of the process. It says: "Another operation of this process is relative to the complete extraction of the greasy matters left in the tissue after printing. For this absorption, a compound of saw-dust of wood, or of any absorbing substance, saturated with naphtha, benzine, and 10 per cent. ammonia, and 3 per cent. of picric acid, is applied with great pressure on the tissue previously placed between blotting paper. The fatty or oily matters are subtracted by the absorbing pad."

There must be some error regarding the mixture of benzine, ammonia, and picric acid; the coloring matter cannot be well protected by this intervention of picric acid.

Printed Goods.

The New York *Dry Goods Bulletin* has the following remarks in its market reports on printed goods:

These goods may be considered as always marketable as long as the styles are attractive. Agents are holding prices firm, while jobbers are somewhat anxious regarding their stocks. Though holding to full prices generally, they are disposed to fall off slightly on less desirable goods. The stock of printing cloths at Providence is 50,000 pieces, and at Fall River about 100,000. Last week's product was 130,000 pieces for only five days. The deliveries were 112,000 pieces. Sales have been limited and prices unchanged.

The demand for printed woolens, specially satinetts, has been extremely active this Spring, and although the market is comparatively quiet just now, the advance in price is firmly maintained and the printing establishments are nearly all running to the full extent of their productive capacity.

SCARLATINE.—Cochineal and lac-dye have been partially superseded in France by the new coloring compound called *scarlatine*, applied with muriatic acid and sulphate of soda as mordants. Used in connection with this vehicle, it gives a splendid

scarlet on flannel and other woolen fabrics. In following this process for 100 kilos. of cloth: 34 lbs. scarlatine, 30 lbs. muriatic acid, 60 lbs. sulphate of soda. The coloring matter being dissolved in a tinctorial bath, the mordant is added. Experiments are being made on cotton with that new scarlet, the advantage of which over the ordinary ingredients is a considerable economy according to the *Teinturier Pratique*.

PUTTY ON GOODS.—Frequently weavers stain the cloth they weave with oil. In order to conceal it, they sometimes put chalk on the spots. This forms a calcareous putty, which can only be removed by a bath of muriatic acid, but this acid solvent somewhat injures the tissues. The best remedy found so far, is the strict prohibition of chalk, or anything used to disguise the mischief, since oil can be removed more easily than the hard putty. Many other causes of defect in dyeing and finishing, (such as fruit stains, light discoloration, rusty marks, etc.) are the objects of close investigation in European factories just now.

THE THEORY of M. Engel regarding the fibrous capillarity and dyeing properties of silicious matters from the sea shore (alleged to be vegetable matters crystallized,) is severely rebutted by Dr. L. L. Lembergt, who says that *porosity* is the simple cause of the peculiarity noticed and exaggerated by M. Engel. The controversy is going on in the chemical press of Europe.

Argol Blacks.

In our February issue we gave a translation from *le Teinturier Pratique* which spoke of "Fast Blacks." We now derive from the same source the following remarks on Argol blacks:

Argol blacks still yield the most satisfactory results. They are dyed in two operations: the mordanting or prepare, and the dyeing properly so-called. It is well to preserve invariable proportions for the first beck, whatever may be the ground of the goods, introducing modifications only in the dye beck.

For 100 lbs. of cloth, light or heavy:

Argol,	15 lbs.
Copperas,	5 "
Bluestone,	3 "
Dry extract of logwood,	5 "
Sumac,	5 "
Dry extract of fustic,	8 "

Boil light goods for three-quarters of an hour, and heavy goods for an hour; lift and air completely cold, and leave them so over night. The next morning give a good rinsing, and after they have been drained as well as possible, enter for three-quarters of an hour, according to the kind of the cloth, in a beck containing 5 lbs. dry extract of logwood per 100 lbs. of cloth.

If the rinsing has been well managed, the beck will remain of a wood color, passing then to a rose, and finally becoming completely deprived of color. As this effect is very rapid the goods should be entered at the heat of 104° F. and rapidly raised to a boil.

In cases where the cloth is already grey from the materials used in its manufacture, the proportion of logwood may be reduced

by a pound but not more, otherwise the blacks will be poor and meagre.

The order in which the wares are introduced into the beek is by no means indifferent. The following order is the best: First the argol, ground or previously dissolved; then the logwood, the fustic, and the sumac; and lastly copperas and the blue-stone previously dissolved separately.

It is a good precaution not to prepare the beek till the moment when it is wanted. Otherwise there may be formed deposits of lake which become unevenly attached to the cloth, and occasion accidents which are very troublesome to deal with.

Notwithstanding the perfect rinsing after the first operation, and to prevent the dye beek from changing color, and in order that it may remain of a proper shade, and be completely exhausted, the author adds to either a block of chalk or a handful of lime slaked and sifted, or of soda ash. Any of these additions gives an abundant froth, and produces a slightly violet tint. The froth is merely due to the escape of carbonic acid, and is of no importance.

Resists and Discharges.

Resists and Reserves.—The application of wax to preserve certain parts of cloth from the entrance of the dye is the first instance we know of the use of resists. This contrivance was found employed by the Hindoos before printing was practised in Europe, and is probably very ancient. Wax is still employed amongst Oriental dyers as a resist in dip-blue dyeing, and in the production of some compound styles from indigo, catechu, and madder. It is now very rarely employed in Europe, but various fatty compounds are still used alone in silk printing as resists in cold dyeing. The nature of the resist proper to be used to protect the cloth must of course depend upon the nature of the color or mordant to be resisted, and the way in which they are brought into contact with the cloth. The simplest case of resist is that where a mordant or color is applied as in calico printing. Here the quantity of mordant or color to be resisted is known. Less simple cases are those in which the resist has to preserve the cloth white when dipped in cold dyeing solutions, as for example in indigo dyeing, where the quantity of color acting upon the resist is not exactly known, and the time during which it has to resist it is relatively considerable; and lastly, difficult cases where the cloth has to be preserved from the action of hot dyeing solutions for a considerable length of time.

In calico printing the agent chiefly used for resisting mordants is lime juice, the active principle in which is citric acid. In all those cases where a simple acid resist will suffice there is nothing so suitable or so safe as lime juice. When iron, alumina, and other metallic mordants fall upon a lime juice resist of sufficient strength there is formation of a citrate of the metal with some excess of the acid, and the special value of citric acid is that most of its salts are not decomposed by a moderate heat or moisture, that they are soluble, and that metallic oxides combined with it lose almost entirely their mordanting and other distinguishing chemical properties, being overpowered, or as it is said, masked in a remarkable manner by the properties of the acid. No other available acid acts so well as citric acid. Oxalic and tartaric acids form salts with oxides, such as iron, which are soluble at first and would wash off the cloth, but in a short time insoluble subsalts form and fix upon the cloth, giving bad

whites in dyeing. The same defect is found in the use of such acid salts as bisulphate of potash, or with such mineral acids as phosphoric acid and arsenic acid, so that practically lime juice (or citric acid) is the only substance that can be used when good whites are required by resisting.

Pipe clay is one of the best of the mechanical, inert, resisting agents. It acts simply by covering the fibre with a coating of clay, which, when dry, is nearly impermeable to water and dyeing materials. It cannot, however, as before mentioned, be advantageously used in roller printing for two reasons—first, it is never free from grit, which cuts the doctor and scratches the roller; and secondly, it cannot be well put on in sufficient quantity. It is therefore only used in block printing; its preparation and application requires a good deal of care to secure good results.

Almost the only practical cases of resists used in dyeing are those connected with the indigo styles, which have been previously referred to. It is evident that such a resist must be either at the commencement insoluble in the dyeing fluid or must become so upon dipping in it. Wax and resinous bodies alone fulfill the condition completely; but, as in indigo dyeing, there are many resists which contain matters soluble at the commencement, but they become insoluble on contact with lime or from compounds of very slow solubility. None of these resists can be used for dyeing in warm liquids. For resisting hot dye liquids there is nothing but the purely mechanical means of so covering, pinching, tying, or compressing the cloth between solid surfaces that the liquor cannot get to the cloth. This is, of course, very difficult, and not much applied, though many attempts have been made in that direction.

Some of the patented processes referring to resists are interesting, and may be briefly noted. Pottram and Taylor have a patent, dated July, 1781, for producing effects by systematically tying up parts of silk handkerchiefs so as to preserve those parts from the dye. Quite recently I have seen large rugs for the African market dyed up with this kind of reserve. The effects were, of course, irregular, but not unpleasant, and when dyed a second time in another color, either with or without freshly tying up, very curious results were produced. Nathaniel Watt's patent, November 22nd, 1787, is for producing designs upon small pieces of cloth, such as waistcoats, by dyeing. The cloth is tightly compressed between two metal plates, on one of which the pattern is cut out, and the other has small holes to admit the dyeing liquor. When thus secured they were plunged into the boiling dye bath. Similar is Bailey's patent, November 28th, 1792, for producing patterns in dyeing by nipped reserves. Blocks were fixed in frames, the handkerchiefs to be dyed put between two frames, and fastened; the blocks pressed the cloth tightly, so that the dye did not gain access, and the parts remained white. The plan of resisting by means of waxy, fatty, or resinous bodies was the subject of a patent to Duffy, February 8th, 1814. A curious attempt to compose a resist which would withstand the action of boiling liquids is recorded in the patent to Richardson and Hilly, July 26th, 1825; it was for application upon wooleens, and was to be made from 5 stones of flour beaten up in 4 gallons of water, which, after standing two or three days, was mixed with the whites and yolks of forty eggs. After having performed its function it was to be removed by soaping. A mechanical reserve in roller printing was patented by Dalglisch, December 6th, 1830. It was intended for reserving in white a cross bar while printing a cover or padding, and was effected by having two belts or cross straps attached at fixed distances, upon which the color fell instead of the whole surfaces.—

(Ch. O'Neill.)

Metallic Colors.

The following notes refer to the printing of metals in leaf or in powder and production of metallic lustrés. In Overend's process, patented February 13th, 1844, a composition of linseed oil and gold size is printed and the metallic powders sifted on. For obtaining a metallic lustre upon woolen goods, Schischkar's patent of November 18th, 1852, consists in preparing the goods with nitro-muriate of tin, afterwards impregnating them with sulphate of copper and steaming. For the same purpose Depouilly's patent of July 2d, 1853, is for exposing the goods dipped in metallic solutions (preferably alcoholic or ammoniacal solutions of metals) to vapors of phosphorous or phosphuretted hydrogen. With the same intention Schischkar's and Calvert's patent of January 5th, 1854, is for impregnating goods with salts of lead, copper or bismuth, and then submitting them to the action of sulphuretted hydrogen gas, or to steam containing sulphuretted hydrogen. Tolson's patent, November 20th, 1855, is to obtain lustre by mordanting in sulphate of copper, and dyeing; then treating again with sulphate of copper and excess of ammonia, washing and immersing in hyposulphite of soda. For fixing gold or silver leaf or powder upon fabrics, Ruding's patent of December 11th, 1855, claims the preparation of a fine dry powder of shellac obtained by precipitation from alcohol; this powder is dusted over the cloth, the metal leaf or powder being applied by a heated printing surface. For metallic lustrés, Schischkar's patent of February 1st, 1856, is for printing or padding with salts of copper or lead mixed with various deoxidizing agents, and then submitting the goods to the action of high-pressure steam. Taylor's patent for applying metallic powders or leaves, dated December 24th, 1856, consists in an arrangement of the printing machinery by which one roller applies the adhesive varnish and the metal is applied immediately afterwards. The application of steel dust in granulated sparkling powder to textile fabrics in design was patented by Thiebaut. In Forrobert's patent, February 25th, 1860, it is stated that silk boiled with chloride of zinc, washed, and then boiled with finely divided gold or silver powder, attracts the powders and becomes coated with the metal. For a cement or mordant upon which flock, metal in leaves, or powder, etc., may be deposited, Thielaut, July 16th, 1860, prescribes 1 quart of soft soap, 1 pint of poppy oil, and 2 oz. of lard, dissolve by heat, cool, and add zinc white and oil according to the nature of the fabric. This size, after printing, is exposed to the air until it is dry enough to be hot pressed. Denham's patent, November 2d, 1860, refers to a method of applying leaf metal to velvet by heating embossing rollers, and speaks of a compound powder used in the trade, and supposed to be a mixture of rosin and dextrine. Verkrugon's patent for applying gold and silver powders to pile fabrics, dated January 29th, 1861, is by means of sable pencils, and appears more artistic than mechanical. In Diess and Condoreau's patent of April 15th, 1862, which is for applying gold and silver leaf to fabrics, it is directed to prepare a double stencil plate with a counterpart which will fit into the cut out parts. The gold or silver leaf is introduced between the two cut plates, and placed upon the part of the fabric to be printed; the counterpart is then brought down upon the plates and forces out the leaf. For depositing silver from solutions upon silk,

Cimey's patent of August 18th, 1862, may be consulted. It includes the treating of the silk, in the first place, with the juice of some acid fruit containing tannin, as currants for example; then treating with nitrate of silver and Rochelle salt, and burnishing. Bennet's patent, April 18th, 1875, refers to bronze, brocade, or gold patterns, and proposes to produce the results more economically by printing the adhesive matter with copper or surface roller, and then passing the cloth through a box containing the required metallic powder, which is caused to adhere to the size by means of running the cloth under a roller which works in the metallic powder.

The styles in which effects are obtained by the direct application of metals are at present few, and generally for exportation to semi-civilized communities; but that is because the results are crude and imperfect, and have nothing of the delicacy and finish demanded for garments and furniture required by a more advanced taste. There can be no doubt that any process which could gild or silver fibres in an even and tolerably permanent manner would become of great value. There are processes by which gold and silver leaf can be applied to cover threads in a fairly satisfactory manner for some purposes; they are purely mechanical, and only applicable to threads. The methods by which metals can be chemically deposited upon fibres leave nearly everything to be desired. Not included in the patents above, is a process of applying metallic tin by printing and burnishing by calendar, which has been applied to some extent upon dyed goods.

Application of Chemistry to Textile Art and Dyeing.

(Continued from page 36.)

The acid, as it comes from the chambers, is concentrated in shallow leaden pans to a sp. gr. of 1.72, at which strength it is used for many purposes in commerce. If the concentration were now continued in leaden vessels, the acid would attack them too strongly; platinum or glass retorts are therefore used, and the operation goes on until the acid attains the specific gravity of 1.85 (66° B). This is the greatest density which can be reached, though acid of 68° B. has been at times put upon the market, the extra strength being obtained by the fraudulent addition of sulphate of soda. Acid of 1.85 sp. gr. is represented by the formula H_2SO_4 ; it generally contains lead, arsenic, nitric acid, or oxide. It may be tested for these impurities as follows. A small quantity of acid is diluted with water; if a white precipitate forms, lead is present. A crystal of ferrous sulphate (copperas) is dropped into a test tube containing some of the acid; the formation of a brown ring indicates the presence of oxides of nitrogen. (Acid used for dissolving iudigo should be quite free from such.) Some of the acid is considerably diluted with water, and a current of hydrogen sulphide (sulphuretted hydrogen) passed through; if arsenic is present a yellow precipitate will be formed. Sulphuric acid is a thick, heavy, oily liquid, boiling at 640° F. It has a great affinity for water, attracting moisture from the air, increasing in bulk, and losing in strength; vessels containing it should therefore be tightly stoppered. When it is mixed with water a large amount of heat is

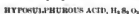
evolved. In conducting this operation, which often becomes necessary in practice, the acid should always be poured into the water, never the water into the acid, as dangerous explosions might be the consequence.

Sulphuric acid is one of the strongest acids known. It sets most of the other acids free from their combinations, and we have seen that the preparation of hydrochloric acid, and nitric acid, as well as many others are based upon this fact. It is a powerful solvent for many substances. Enormous quantities of sulphuric acid are used in the arts, and for a great variety of purposes, and Liebig has declared that the state of civilization of a country may be measured by the amount of sulphuric acid it consumes. In the textile arts it is chiefly in the preparation of garancine from madder, for dissolving indigo for the acid baths or "sour" used in bleaching, in the manufacture of shoddy, etc. If we wish to test a soluble substance, or a solution for the presence of sulphuric acid, we will acidulate it with a little hydrochloric acid, adding a few drops of barium chloride; if sulphuric acid is present, a white, heavy precipitate of barium sulphide is formed.

Sulphuric acid is a dibasic acid. It is, therefore, capable of forming acid and neutral salts with a number of metals, a fact of some importance for the dyer to be acquainted with. With potassium and sodium, it forms the following salts:



Nordhausen acid is obtained by the distillation of ferrous sulphate (copperas). It forms a very heavy, brown, oily liquid, has a sp. gr. of 1.9, fumes strongly in the air, and consists of a pure mixture of sulphuric acid and sulphur trioxide. It was formerly used to a considerable extent, but has now been almost entirely superseded by the sulphuric acid prepared in the manner described.



When sodium sulphite (amphite of soda) is boiled together with fumes of sulphur, a new salt, sodium hyposulphite is formed.



This salt, often called "hypo," is much used in photography, and its use, conjointly with an acid, has been recently proposed for bleaching wool. Hyposulphurous acid is not known in the free state; upon the addition of acid to a hyposulphite, sulphurous acid is set free, while sulphur separates at the same time.

COMPOUNDS OF SULPHUR WITH HYDROGEN.—HYDROGEN SULPHIDE, H_2S .

Hydrogen sulphide (sulphuretted hydrogen) is prepared by the action of an acid on a metallic sulphide, iron sulphide being generally used for the purpose.



The apparatus in which it is generated is similar to that for preparing hydrogen. Hydrogen sulphide is a colorless gas, possessing a disgusting odor, burning with a pale blue light. Even

when it is diluted, the breathing of it should be avoided, as it has a poisonous effect on the organism. It is soluble in water, but soon decomposed, especially under the influence of air and warmth. In nature it occurs free in certain mineral waters, to which it imparts a very disagreeable smell and taste.

It forms characteristic compounds with many of the metals which are called sulphides; some of these combine with it even in the metallic state, like silver, lead, and copper, which tarnish in an atmosphere containing sulphuretted hydrogen.

(To be continued.)

Extracts of Recipes from Foreign Sources.

Ponceau, Safranine and Scarlet on Cotton Satin.

This color will not rub.

1st. Put the bleached goods through stannate of soda, at 2° B.; leave one hour.

2d, Pass through sulphuric acid bath, at 1°, wash, and

3d, Dye with scarlet.

4th, Pass through bath of tartar emetic, whizz out, and

5th, Dye in a fresh bath with safranine. After dyeing pad in 10 per cent. alizarine oil solution, dry and steam. Or, after bleaching, prepare cloth with alizarine oil, mordant with acetate of alumina and dye as above.

Black for Printing on Cotton Yarn.

1st recipe:

- 4 lbs. Logwood Extract, at 6° B.,
- 4 ozs. Dextrine, and
- 4 ozs. Wheat Starch.

Boil, stir until cold, and then add:

- 14 lbs. Pyrolignite of Iron, 25° B.

Mix well and it may be printed at once. Dry, hang up for a day, steam, and if necessary rinse.

2d recipe:

- 4 lbs. Logwood Extract, 6° B.,
- 4 lbs. Gum Tragacanth.

Boil, stir till cold, and add:

- 4 ozs. Bichromate of Potash,
- 2 ozs. Blue Vitriol.

Mix thoroughly, print, dry, hang up for a day and steam.

Black for Printing on Woolen Yarn.

Dissolve:

- 3 lbs. Logwood Extract in
- 6 lbs. Boiling water.

Cool, and add to the clear liquor:

- 4 lb. Pyrolignite of Iron, at 5° B.,
- 2 ozs. Nitrate of Iron, at 50° B.

Thicken with

- 4 ozs. Gum Tragacanth.

The quantity of gum is modified according to requirements.

Brown for Printing on Woolen Yarns.

- 1 lb. Peachwood Extract (Brazil Wood),
- 4 lb. Quercitron (bark) Extract,
- 6 lbs. Water.

Dissolve at the boil, and thicken the clear liquor with 2 ozs. Tragacanth.

Then add:

- 34 ozs. Acetate of Alumina, at 5° B.

To darken the brown some pyrolignite of iron is added. Print, hang up, steam and rinse.

Bismarck Brown for Printing on Woolen Yarn.

3 ozs. Bismarck (Aniline) Brown,
More or less, according to shade required.

3½ gallons Boiling Water.

When dissolved, cool and thicken with:

8 ozs. Tragacanth Water,

8 ozs. Starch, and

4 ozs. Glue.

Print, hang up for six hours, steam at 90° C., and rinse.

Patents Connected with the Tinctorial and Finishing Industry.

Cloth Rolling Machine: A. Brown, Springfield, Vt., March 18th, 1880.—The apparatus is contrived for winding folded double width goods on a flat centre. The cloth passes to the winding centre from between a curved table and friction roller, which are carried by pivoted arms connected with springs or weights, so as to hold the roller with constant pressure against the roll in contact.

Centrifugal Machine: S. S. Hepworth, Youkers, N. Y., March 16th, 1880.—The basket is full open with no pieces on outside; the motive power is actuated under the basket, which is loose on a spindle rotating vertically. The basket can be raised, and then a valve is open by the action of a handled wheel and lever.

Centrifugal Machine: T. H. Muller, N. Y., Assistant to S. S. Hepworth, Youkers, and J. Colwell, N. Y.—This machine differs only from the above in the vertical spindles bearing the basket loose. This spindle is conic, and the collar plate connects with a handled wheel operating under the basket.

Dye-stuff or Coloring Matter: H. Caro, Mannheim, Baden, Germany, assignor to Badische Aniline and Soda Fabrik, same places, April 8th, 1880.—A new coloring matter obtained from the reaction of the diazo compound of the sulpho acid of naphthalamine and betanaphthol, or by any other method which will produce like results.

REVIEW OF FOREIGN PATENTS.

The following synopsis of foreign patents on printing and dyeing is abstracted from specifications most likely to convey suggestive and useful information:

Improvements in Apparatus employed in the Engraving, Milling or Chasing of Rollers: G. Moulton, England.—This invention relates principally to apparatus employed for metal printing rollers, but is also applicable to rollers of cylindrical surfaces. The roller to be engraved is usually revolving while a carried cutting tool cuts upon the surface of the rollers, said carriage being imparted by means of a rack and pinion. This patent improves on that system, by using a screw and a shaft in lieu of a rack, and by "indexing" the distance apart of the lines cut upon the roller or cylindrical surface. This indexing is done by rotating the screw at the required intervals, and to a suitable extent. The shaft is connected, for that purpose, by gearing with a nut heading the screw.

There is no doubt an economy of time and a certainty of accuracy in this simplified method of moving the piece to be engraved.

Improvements in the Vats employed for Dyeing Wool in Indigo: W. Croysdale, England.—The object of this invention is to save time and economize indigo in dyeing, and to dispense with the nets or bags used in the dyeing and wringing processes. It consists in a perforated receiver of metal lowered into the vat; which contains the amount of liquor required. The wool is placed in the baskets and subjected to the process of dyeing. When this is accomplished the receiver is drawn out by any suitable power and tilted on one side, to get as much liquor as possible out of the wool. The tilting operation may be done by any ordinary means. A doorway is provided in the side of the receiver to place or remove the wool.

Improvements in Singeing Fabrics: C. J. Percival, England.—This invention relates to singeing woven fabrics at the selvages only. It supports the hand-work heretofore applied to that part. The cloth passes over and under straightening bars, thence between two sets of gas-burners fitted into horizontal tubes placed on each side of the cloth at the selvages, and then between a pair of drawing rollers, which pull the pieces through the apparatus at the speed desired. The arrangement can be horizontal or vertical, and the jets can be inclined so as to singe both sides along the selvages.

Improvement in Cleansing Woolen Cloths before Dyeing: J. H. Rogers, England.—This has for its object to suppress the injurious inconvenience of the hydrochloric acid fumes and to reduce the cost of acidulated bath for the cloth. The patentee substitutes sulphuric acid (which costs less) in using lime in combination or its salt equivalent. The result is the formation of hydrochloric acid and the precipitate of sulphate of soda at the bottom and sides of the tank. Forty-five pounds of sulphuric acid, known as chamber acid, at 120° T, diluted to 2° T. and 54 lbs. of common salt in crystal well mixed and dissolved, will produce a bath ready for use. It will cleanse the cloth readily and cheaply without the inconvenience mentioned, since the solvent is obtained in its nascent state.

Improvements for Stiffening and rendering Fabrics Impermeable: L. W. Roberts, England.—Combinations of soaps and salts, called alkaline bistearates, alkaline bioleates, alkaline bimargarates, bipalmitates, biresinates, etc., with neutral metallic salts, alumina, zinc, lead, magnesia, etc., can be amalgamated on fibres as a size. All these bisalts are translucent and insoluble in water, thus protecting fibres against exterior moisture, such as rain. It also gives a desirable rigidity, and when employed in sufficient quantity makes the fabrics impermeable,—water-proof as well as dust-proof. Taking black taffetas as an example of application, some biesteate of ammonia solved in benzine, as a first coating, and a solution of acetate of alumina for a second, a good result is obtained.

Decomposition of Vegetable in Wool for Shoddy: A. E. Rowley.—The mixed fabrics in rags are subjected in a close chamber to the action of a great heat and of gaseous hydrochloric acid. The vegetable fibre carbonizes and the animal remains intact.

Improvement in Dyeing Hosiery Goods: J. R. Ashwell.—The indigo dyeing of cotton and merino hosiery is not always a success as an even tint. The rapid action of the air on the goods taken from the vats, produces an oxidizing effect immediately on the outer

surface of the product, which is darker outside than inside; streaky and uneven color consequently ensues. This is obviated by the use of a perforated cage, which prevents the sediment or supernatant serum from reaching the goods enclosed in it, and by an adjacent pair of elastic rollers through which the fabric is passed to squeeze the liquor from it before exposure to the air. Should it be inconvenient to have the squeezing rollers near the vats, they can be placed anywhere else, providing the goods are transported thereto in a vessel containing enough liquor to cover them as a protection against air oxidation.

Preparation of Aniline Dyes: J. S. Butler, England.—Red, magenta, cardinal, fuchine and analogous colors, the aniline compound is dissolved in boiling water, to which is added three per cent. of muriatic acid with one per cent. of chlorate of potash. Same process, but only one-half of acid and chlorate, for blue, mich. blue, violet, mauve, black, etc.

Improvement in Re-dying Piece Goods of any Fibrous Composition: G. Rydill, England.—Re-dyeing piece goods from dark to lighter shades, such as yellow, etc., can be done by nitrate of soda treated with sulphuric or muriatic acid. Any kind of animal fibre can be discolored and recolored by the process, viz: Nitrate of soda is dissolved to any required strength, then mixed with a dilution of sulphuric or muriatic acid. A small quantity of logwood, alun, salt, ammoniac, etc., to bring up any dark color required. As the residue of the operation is nitrogenous and ammoniacal, it can be utilized as a fertilizer, especially if mixed with sewage water.

Improvement for Drying Yarns: W. L. Wise, England.—It consists in a rotary frame with arms and pins, swinging the hanks in the air to the speed desired. Artificial ventilation can be placed in the frame centre to increase the air-drying process, which is far superior to artificial heat. The rotary arms on which hang the yarns, rub against a small wheel alternately, and revolve, in order to change the position of the yarn for equal evaporation.

Improved Finishing on Cotton Fabrics: R. Wilson.—One roller bearing the fabric is placed between two larger cylinders, revolving alternately in opposite directions. The contact rubs the cloth, and the heat evolved during the friction from the hollow cylinders produces the finish.

Process to obtain a New Coloring Matter and various Shades of color from the same Bath: C. Girard.—A mixture of resorcine with phthalic acid produces plureoscine, which is dissolved in alkaline solution. Adding a dilution of hypochlorite the precipitate gives the new yellow color, styled by the inventor aureoline. Alkaline solutions of this matter produce a yellow-green by reflected light and a rose color by transmitted light. When treated by hypobromite it gives another color called red aureoline. From this variety of shades, from yellow through orange to intense red, are obtained when treated by nitric acid and heat, or by other vivifiers, such as acetate of soda, acetic acid, etc.

WE WILL PAY 75 cents cash for January numbers for 1879, 50 cents cash for July numbers for 1879, and 40 cents cash for January numbers for 1880.

SAPONIFICATION OF PETROLEUM.—So far this result had not been satisfactorily attained; but it appears that recent attempts at saponifying coal oil have been successful in Europe. Treated at a high temperature with strong alkalis, this oil gives soap having special properties for scouring fibrous material to a superior degree.

OLEONAPHTHA is another product derived from mineral oil, specially from Russian naphtha. According to the *Technologist*, oleonaphtha is a lubricator of superior value. It is inoxidable, insinative and irancindable to a greater degree than any other lubricating oil, because it possesses the remarkable property of repulsing oxygen, and consequently of remaining always neutrally liquid, very important points for machinery. Induced by these facts to apply this oil for hatching wool and jute, some manufacturers found it so far worthy of being preferred for use to vegetable oil.

NEW SIZE FOR HEDDLER.—The paste made with flour or starch applied heretofore on heddle strings, with several coatings of varnish to make them smooth and sliding, is superseded by metallic soap, which is made from a mixture of oil, water and oxide of lead or of zinc. That soap is liquified for use by some turpentine or petroleum, and applied like a paint with a brush on the strings.

FUCHSINE IN WINE can be detected by rubbing a drop of the liquor between the hands. Evaporation will leave a red spot, which will not be removed by washing if fuchine is present. It can also be detected by the spectrum microscopically examined.

JAVELLE WATER.—This bleaching liquor can be considerably improved by substituting bicarbonate of soda in excess for the ordinary dose of soda used with the chloride of lime bath. This precipitates the carbonate of lime, from which the clear liquor can be decanted. The bicarbonate of soda gives to the bath good emulsifying properties favorable to bleaching.

CHALK AN ANIMAL MATTER.—Another microscopical observer comes out with the assertion that chalk,—carbonate of lime, the largest constituent of the earth,—is composed of living vibrios. He positively affirms that under the extreme power of a great magnifying microscope these animalcules could be distinctly seen moving in their inserted position. The great observer Pasteur, as it is known, working in the same direction in the liquid elements. To him are due the important discoveries of the living forms of ferments. He has also recently demonstrated that all purulent diseases are fungus depositories, and that when the poison is in the blood, inoculation of the purulent matter may eradicate the evil. On these premises it has been found that deterioration of fabrics from ferments is caused by animal organism creeping in the amylaceous fibre.

SAFLOWER.—The separation of the yellow fibres which connect the three eyes of the flower is effected by means of several pair of rollers of which the first has the slowest motion while the others rotate more rapidly, (Patented).

IRON STAINS.—Besides tobacco salivation stains, iron spots, caused by broken teeth and other metal fragments, are the object of severe enactments in European factories. Any mischiefs occasioned in dyeing by such causes from neglect of workmen are punished by fines or other penalties.

TO PRECIPITATE ALUMINA.—Guyard has found that when alumina is precipitated in the presence of glycerine, the precipitate is not in a gelatinous form, as usual, but in dense flakes, which are very easily purified by washing.

BLACK DYE FOR WOOD.—R. Godefroy recommends (*Zeit. Allg. Oest. Ap. Fer.*) the following as giving a brilliant and durable black. The pieces of wood are first painted or washed with a solution of chloride of aniline in water, to which has been added a little chloride of copper. After drying they are painted with an aqueous solution of bichromate of potash. It will not be necessary to repeat this operation more than two or three times. This black color is not even affected by chloride of lime.

A NEW REAGENT PAPER FOR ACIDS AND ALKALIES.—Dr. Freiso recommends a tincture of logwood as a substitute for the tincture of litmus. Litmus has the disadvantage that the change of color from blue to red, and *vice versa*, on reaching neutralization, does not appear suddenly, but only very gradually. Logwood, on the contrary, indicates the excess of either at once; acids turn the color to yellow, and alkalies to bluish-violet. The best proportion for the tincture is one part of logwood, digested for twenty-four hours in twenty parts of distilled water, and filtered rapidly.

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Tinctorial Glossary.

(Continued from page 77.)

COLORIMETER.—An instrument to indicate the heat given out by bodies in cooling or passing from one temperature to another, which is ascertained by the quantity of ice it will melt.

CAMPEACHY WOOD.—A tinctorial bark called *logwood*; used for black dyes.

CAMWOOD.—A red dyeing wood, the produce of *Baphia nitida*, imported in sticks from the West Coast of Africa. Camwood has the same properties as Brazil wood, but dyes are not in accord as to their relative value. Some say it is superior, others say it is inferior both in richness and durability to Brazil wood. But it yields a rich scarlet shade, on account of the yellow elements it contains. It can be used where peach wood, sapan wood, and Brazil wood are prescribed. The process of using it accounts, no doubt, for the contradictions referred to in regard to its efficiency.

CANARY WOOD.—Orchilla, produced in the Canary Islands. It will be reported under its proper heading.

CANARY WOOD.—A fancy wood, *Laurus indica*, produced in Malacca, of a golden yellow color.

CARBON.—An elementary, or simple non-metallic solid body, very widely diffused in nature. Its purest and rarest form is that of the diamond. Nearly pure, it occurs very abundantly in the forms of graphite and anthracite. In combination with oxygen, as carbonic acid, it exists in the atmosphere, and in the waters of most springs; also in limestone, chalk, marble, and calomite. Combined with hydrogen, it enters largely into coal, peat, and lignites. It is

an essential constituent of organic matter, and hence it has been termed the "organic element." Charcoal, lamp-black, and coke are more or less pure forms of carbon. By strongly igniting lamp-black in a covered crucible, the element is obtained sufficiently pure for most chemical purposes. It is also produced by burning a jet of olefiant gas in an atmosphere of pure chlorine; the amorphous carbon is collected in deposits in a vacuo at red heat. Combined with oxygen, it constitutes carbonic acid, purposely made in preparing soda water, aerated bread, etc. This carbonic acid combined with metals, earths, and alkalies, produces the substances known as carbonates, so invaluable in arts and industries. When carbon combines with other substances than oxygen, it produces carburets instead of carbonates, forming carburetted hydrogen, which is the type of all our most important materials for artificial heating and illumination. Animal carbon is burned bones, used as a discolorant and purifier. Carbon, in the form of diamonds, has just been produced by synthesis for the first time. It has been discovered that carbonic gas combined with hydrogen, subject to an immense pressure and heat, could be liquified and solidified under the phenomena that hydrogen was freed by metals for which it has great affinity. This separation under extreme heat and pressure causes the crystallization of carbon gas in its purer form of 'diamond. But this artificial product costs more than the natural gem. Sulphide, or bisulphide of carbon, a colorless, pungent, fetid liquid, extremely volatile and unfreezable. It produces intense cold by evaporation, and is the most powerful frigorific agent known. Sulphide of carbon is now extensively prepared and used as a solvent, and as a disinfectant. It freely dissolves sulphur, phosphorus, etc., and in burning produces sulphurous acid.

CARBOY.—A large green bottle, cased in basket or wood work, used for carrying liquid acids too powerful to be carried in casks.

CALORIC.—The matter or cause of heat.

CARBONATES.—Combination of carbonic acid with different bases.

CARBONATE OF LIME.—Lime united to carbonic acid,—chalk.

CARBONATE OF POTASH.—A fixed vegetable alkali, united to carbonic acid.

CARBONATE OF SODA.—Mineral or vegetable alkali united to carbonic acid.

CITRIC ACID AND CITRATES.—Pure acid of lemon, and salts formed by citric acid with different bases.

CACTUS EXTRACT.—A carmine red, extracted by Vogel from the blossoms and leaves of the Agave plant, which has varieties of textile application besides the tincture. The cactus coloring matters, specially from the *Opuntia* sort, has some similarity with cochineal,—for this plant is one of the species of shrubs upon which the cochineal feeds. This species is called *Cactus Cochiniifera*, on account of this peculiarity. Should this plant, (very prolific in Mexico), be more abundant in or near industrial centers, it is probable that its fruits and flowers might be economically applied as a dyeing substance.

CALCINED ALUM.—(Alumen ustum). A form of using alum

as a mordant in times when the substance was less pure than at present. Heat expelling a portion of the excess of acid retained by the iron and other impurities.

CALCINED COPPERAS.—Calcination on sulphate of iron or green copperas, makes it lose water and some acid, while it gains some oxygen.

CALCINED FARINA.—A gum substitute used in calico printing; it is flour of potatoes reduced to starch by heat.

CALCIUM.—The metallic portion of lime, and from which many chemical names are derived. Lime is the oxide of calcium; chalk is the carbonate of calcium, and muriate of lime is the chloride of calcium, etc.

CAOUTCHOUC, OR INDIA RUBBER.—A vegetable gum, soluble in coal naphtha, turpentine, and bisulphide of carbon. Attempts have been frequently made to use this solution as a vehicle for pigment colors, but so far as known, without success. It has been applied to fabrics by blocks, as a means of fixing blocks and metallic designs, but it is unsuitable to mix with pigments.

CARPUCE COLOR.—A deep toned reddish-orange. It resembles a strong chrome orange on cotton, wool, and silk. It is obtained by a proper mixture of deep orange and yellow, having the red in excess, as in the following recipe for dyeing 50 lbs. of wool. *Yellow part:* 3½ lbs. fustic, 3 oxy-muriate of tin, 1 cream of tartar. *Red part:* 2 lbs. oxy-muriate of tin, 1 cochineal. The yellow is first dyed, and then the cochineal and tin added. In printing, it suffices to mix at once, a little made scarlet color, with orange, as for example. *Carpine for wool and shawls:* 4 quarts orange for wool, 4 pints scarlet for wool.

CARBAZOTIC ACID.—Picric acid (already treated of).

CARMELITE COLOR.—The color so-called, is a yellowish orange, mixed with brown; darker than the colors called wool colors. In Chevreul's nomenclature it is described as 3 orange, 15 tones. The following recipes are given by Dumas. *Carmelite:* 1 sapan wood liquor at 6°, 1 pint berry liquor at 6°, 1 pint log-wood liquor at 6°, 10 ozs. starch; boil and add 12 ozs. oxy-muriate of tin. In woolen dyeing, and in cotton dyeing, carmelite is obtained by saddening orange and using liquor to brown it. Carmelite shades are also obtained upon calico by printing or padding a mixture of equal parts of bronze liquor and buff liquor, and raising in lime.

CARMIN.—A red pigment, prepared from madder or cochineal. French writers have a *carmine of indigo*, also *purple carmine*, or *carmine and purple*, meaning murexide.

CARRAGEEN MOSS.—*Ireland moss, Irish moss, lichen*, etc. A thickening agent for colors in place of gum, but as a mucilaginous jelly, it has not a sufficient solidity unless fortified by a more homogeneous body. It has lately been transformed into an edible, under the form of jelly, substituted for French *topioca*, *sago*, etc.

CARTANES.—A patented mixture of cochineal, tin salts, and safflower, for dyeing tissues, or stuffs of silk and cotton.

CASEINE.—Pure curd of milk, obtained by acting upon milk

with weak acids. It is extensively used in Europe in the dry state for calico printing as an albumen, for fixing pigment and aniline colors. Cheese, digested with ammonia, makes a fair lactarine or caseine.

CATECHU TERRA JAPONICA, CACHOU, ETC., is the dried unjuice of certain trees, as a rosin. Its quality varies according to the method of collecting and drying it; also according to the influence of age and weather. Soft and uniformly dark catechu is reckoned inferior; it should be brittle enough to break under the hammer, and the interior should not be pitchy-colored or soft, but rather of a buff or cream color. There is, however, exceptions to this rule, as the chemical characteristic of the substance is not yet well defined. The best way to ascertain its value, is to test it in dyeing. It was formerly supposed to be of a mineral origin, and only used for medicine until it became cheap enough to be applied in dyeing and printing. It was first used with madder colors, under the name of garancine styles. Its applications have been kept secret for a good while, and many shades and colors were derived from it, as aniline-to-day. Catechu is one of the astringent or tannic substances in great use, but not of the same kind, as gall-nuts. Its acid is called *Japonic acid*, and possess properties different from tannic. The acid and its application in calico printing differs also from most other coloring matters. For browns, in printing, it is mixed with salamoniac and nitrate of copper. It is the agent promoting, in combination with ammonia, chemical action of catechu. It acts as an oxidizing medium for obtaining oxygen from the air, and transferring it to the catechu, which of itself absorbs little of oxygen. This gives to it a great affinity for the fibrous cloth, and renders it insoluble or unalterable in water. This explains the solidity of the catechu colors.

CATECHU COLORS.—The following recipes and remarks will illustrate the valuable applications which the substance is susceptible of:

Tea Drab Color.—All wool. 1 gallon catechu liquor at 24°, 2 quarts sapan wood at 11°, 4 ozs. extract of indigo, 1 pint cochineal crimson, 6 ozs. alum, 6 ozs. oxalic acid, 4 lbs. gum (if for blocks), 8 lbs. (if for machine).

Catechu Brown for Garancine.—6 lbs. catechu, 1 gallon water, 1½ salamoniac; boil, strain, and add 2 gallons gum water, 2½ pints nitrate of copper at 80°, 1½ pints acetate of copper. By adding red liquor to this color, the resulting brown is modified toward red. This color must be aged for not less than 3 days.

(To be continued.)

THE PRICE OF Vol. I, 1879, TEXTILE COLORIST, is \$10.00.

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The attention of all Dyers and textile manufacturers is asked to the above named articles. Much of Logwood Extract in the market is unsatisfactory on account of inferior manufacture and adulteration; and the Cutch usually found in the market is irregular and unobtainable in quality and is very crude and dirty; these facts have suggested the propriety of putting these articles on the market in an improved and refined form, free from all the objectionable impurities usually in them and in a form that will be found convenient and ready for use. They are in all respects clean, quickly, easily, and perfectly soluble, and are ready for their work without any further preparation. Thomas's Improved Logwood and Thomas's Cutch will be found to fill a want heretofore felt by Dyers. Their strength, reliability, depth and brightness of color, fastness in boiling and permanence in sunlight are very desirable. Their purity and strength is such that they will be found to be very economical, and they are very convenient to use. Thomas's Improved Logwood (in paste) and Thomas's Cutch (in paste) are both designed to be used in all cases exactly as the crude articles are used, either with or without the addition of other coloring matters, and are to be used with all metallic mordants in the usual way. They are put up in the same as Thomas's New Cutch, Barrels of about 100 pounds, also in Half-barrels and Quarter-barrels for trial. Address Orders to N. SPENCER THOMAS, Elmira, N. Y.

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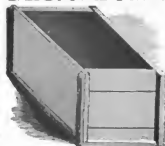
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The Best The Cheapest
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BLACK DYE,
TARTARIC ACID,
ANILINE MORDANT.

Our Black Dye will color a perfectly fast Black on Raw
Woolen in one bath, one operation, saving to color about 20
per pound of Cotton, coloring in 15 hours, and goes direct
to extractor without washing, carding equally as well as
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(With Special Merchant.)
A Pure Vegetable Dye for
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coloring 1 lb and 1/2 cents per
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STANNATE OF SODA,
25%, 40%, and 50% Oxide.
COCHINEAL, GUARANTIED.
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CRYSTAL SIZE—Largest, cheapest, best material for sizing, dressing, finishing textile fabrics generally; increases the
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Two Practical Recipes by which the annexed Samples were Dyed:

For the quantity of dyestuff, see Samples.

100 lbs. Material.

Boil 10 lbs. Glauber salts,

4 " Sulphuric Acid.











Cool down to 160° F., enter the dissolved dyestuff, stir well, and then enter goods, turn rapidly while raising temperature to boiling, boil about 10 minutes, wash well and done.

100 lbs. Material.

Boil 10 lbs. Glauber salts,

8 " Muriatic Acid.

Cool down to 160° F., enter the dissolved dyestuff, stir well, and then enter goods, turn rapidly while raising temperature to boiling, boil about 10 minutes, wash well and done.

German town Yarn. Muriatic Acid Mordant.  14 ozs. R to 100 lbs.	Felt. Sulphuric Acid Mordant.  16 ozs. R to 100 lbs.	Carpet Yarn. Sulphuric Acid Mordant.  14 ozs. R to 100 lbs.	Flannel. Sulphuric Acid Mordant.  16 ozs. R to 100 lbs.	Worsted Hovings. Muriatic Acid Mordant.  16 ozs. R to 100 lbs.
German town Yarn. Muriatic Acid Mordant.  14 ozs. R R to 100 lbs.	Felt. Sulphuric Acid Mordant.  16 ozs. R R to 100 lbs.	Carpet Yarn. Sulphuric Acid Mordant.  14 ozs. R R to 100 lbs.	Flannel. Sulphuric Acid Mordant.  16 ozs. R R to 100 lbs.	Worsted Hovings. Muriatic Acid Mordant.  16 ozs. R R to 100 lbs.

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SAL SODA,
CAUSTIC SODA, 76 per cent.
ENGLISH ALUM, "Turkey Red" brand.
Entirely free from Iron.

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Turkey Red Dyeing Company,

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The **only Turkey Red dyed** in this country that has stood the test of time. Guarantee given that our Red, Pink, Purple, Drab, Lavender, Black, Blue, Salmon and Orange, stands the Bleaching Process equal to the foreign colors.

Our prices are as low as any domestic dyed **Turkey Red Colors** in the market.

We dye more fast colors than all the other Turkey Red dyers in this country put together. Send for samples and circular.

Turkey Red Scarlet for Table-cloths and Awnings.

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MANUFACTURERS OF



Dye Wood Extractors

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FOR QUALITY AND ECONOMY READ TESTIMONIALS:

We are using your Extractors, they work well, give us great satisfaction and are a saving of at least 25 per cent.

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For H. H. GREEN, Sup't., Phila.

JAMES MARSH & Co., Phila.

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Agent for Chesapeake Flavine; K. Oehler's Aniline Dyes; N. Spencer Thomas's Concentrated One Dip Dyes in Paste and Powder, Nos. 33, 44, and 55. English Fig Soap a specialty, for washing wool.

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THE EASTERN CHEMICAL WORKS.

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Manufacturers and Patentees of Aniline and Resorcin Colors. H. D. DUPEE, 79 Kilby St., Boston, Mass., sole agent for the United States.

CHLOROZONE.

This New Patented Liquor is the best and cheapest Bleaching Agent in existence.

For Sale, put up in Carboys, by **E. LEFRANC**, 112 S. 17th Street, Philadelphia, Pa.

TEXTILE COLORIST.

Entered according to Act of Congress, in the year 1880, by DR. M. FRANK, in the Office of the Librarian of Congress at Washington, D. C.

Vol. 2.

Philadelphia, May, 1880.

No. 17

On Calico Printing.

BY DR. M. HASENCLEVER.

(Continued from page 74.)

FINISHING.

There are various operations belonging to the finishing process, and often certain styles require a special treatment. The goods after having been treated, as before described, are not yet suitable for the market. The colors are not considered to show so bright and favorable as they will when starched and pressed, but in reality a good and experienced printer and colorist can see better the quality of color and workmanship before finishing than afterwards. The buyer, however, looks much on the finish, on the degree of stiffness and the lustre, and he considers a piece of printed cloth more valuable if it is finished well, which often means made heavier by starch and China clay, and with an artificial gloss, than on the colors and their good qualities, and it is therefore an important study for the printer to try and suit all his customers. As the taste of the various market places is almost never alike, the goods have therefore to be treated accordingly. The first operation in finishing is the starching. When the goods arrive in the finishing department in a kind of a moist state, they are run over a stretching board into a box with solution of starch, ultramarine, etc.

The starch is very often and for many styles always replaced by rousted potato starch or sago flour, which is sold under the names of artificial gum, or gum substitute. The color of this gum varies according to the pattern. Light patterns require light colored gum, and dark patterns are preferred to be stiffened with brown gum. In order to increase the gloss on the goods, a solution of silicate soap is added to the starch or gum solution. The preparation of this soap is the following:

When common tallow or oleine soap is finished and ready to be let down in the cooler, a solution of silicate of soda is added, and the mixture well worked together. It is then allowed to cool, and cut in bars, and dried in the air. It depends on the taste of

the finisher, how much of this silicate of soap may be added to the gum solution.

The addition of bluing is an important improvement to the good appearance of the goods. In the original state, the goods have a kind of a yellowish tint, owing to the treatment in the various departments, and it would always make an unfavorable effect to the eye. A slight bluish tint will improve this very much; the colors show clearer and seem to contrast more with each other, and also the white places in the pattern look brighter and lighter. The quality of the ultramarine used for this purpose is also of

no little importance. There are ultramarines in the market from reddish-blue to greenish-blue, and the shade has to be selected according to the appearance of the cloth, and the qualities

of the various colors. An addition of the so-called Alpine white, or China clay is considered to add considerably to the appearance of the finished goods, and in order to suit the market, the printer is obliged to add this article, although he knows himself best that it is more defrauding than improving, as the price of the goods is fixed, not only by the quality of the cloth and the colors, but also by their weight. Therefore the addition has to be made. They are mixed together with the starch or gum, and ultramarine solution.

In dissolving the starch, it is often customary in many print-works to add the dry starch to the boiling water. This might be improved some by mixing the starch first with a small quantity of cold water, stirring well, thus making a uniform mixture, and then adding this to the boiling water. By this method the starch needs only a

few minutes boiling; it gives a more uniform mixture, and reaches farther. After the cloth has gone through this prepared mixture of starch or gum, ultramarine and China clay, it enters the drying apparatus, which consists at present of from 15 to 21 cylinders. (Fig. 1.) Until a short time ago, this drying apparatus contained only 5 or 7 cylinders, but lately the increase to 15 to 21 has come into general use, and has proved a perfect success. These

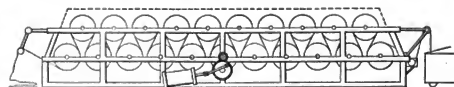


Fig. 1.

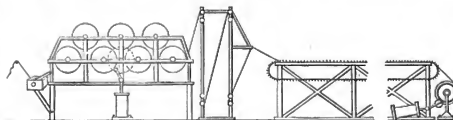


Fig. 2.

other under the press. It can be a hydraulic press, or in not very large works a hand press does very good service.

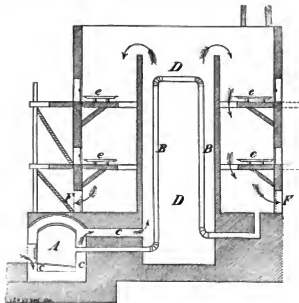
The workman has to be careful in piling these bags. If not brought up very exactly, the pile bends in the middle and it is very easy to spoil, as well as the bags as the press, by careless handling. The pressing commences gently and is very gradually increased, until it receives at last the full force of the press. It is left for some time under the press before taking out, in order to part with as much water as possible.

The bags are now taken out and the cakes removed to another place, where the moist outside is scraped off and pressed again afterwards. The inner parts of the cake are broken up as much as possible and dried by artificial heat.

The drying of the garancine is mostly done in drying rooms, which are arranged similar to those in starch manufactories. A furnace, which is placed at one side of the room, furnishes the necessary heat, which is led through pipes through the whole place. The drying pans, upon which the garancine is spread out, run on rails, in order to effect the filling and emptying with as little trouble as possible. Ventilators, which are placed in several parts of the room, allow the moisture to pass out.

The above method does very well for smaller factories and dye-houses, but is not very practical for extensive works, and a more completed apparatus is therefore necessary, where garancine manufacture is made a specialty, or where larger quantities are prepared.

This apparatus consists of a round wall, built of bricks, with galleries, inside of which there are generally two in the apparatus.



In the centre another wall is erected which reaches up until 2 or 3 feet from the ceiling. The heat comes from the fire *A*, and is led by a pipe through the inner wall, heating the air in that place. Common air is introduced through an opening, *C*, near the fire; the

air gets first heated to a certain degree by passing around the fire, and by entering the room *D*, gets more heated by the pipe *B*, thus causing a constant current of air through the whole place.

The garancine is dried on pans *e e*, which lay on rails on the galleries, and can be emptied and filled again through doors in the outer walls. Near the floor of the outer wall, doors, *F*, are placed to allow the air to pass out, and also to regulate the current which takes the moisture from the garancine out. The temperature, which can be allowed in these drying apparatus, without injuring the quality of the garancine, is from 120° to 140° F. More heat is not advisable to use, and experiments have shown that garancine, which were heated and dried at a higher temperature than above, are inferior in quality; they also do not produce such bright colors as those products which have been treated at lower temperatures.

The size of this drying apparatus as well as some special arrangements regarding the facilities in the manipulation, depend generally on the quality of garancine to be produced, and each establishment has to use its own judgment.

The dry garancine is taken out and allowed to cool. Then it is broken up as fine as can be done with the hand, and ground in mills, arranged similar to our coffee mill, and at last crushed into fine powder by vertical stones, sifted, filtered through rough bags and packed.

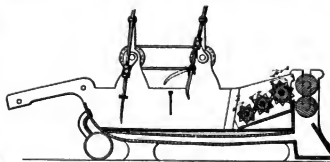
Many manufacturers add, before packing, some chalk powder and soda to the garancine. This cannot at all be considered an adulteration, but it is generally done as a precaution to neutralize any acid which might have possibly been left in the product.

The quantity of these substances, which can be added to advantage, is found out by testing through dyeing. Several samples of the garancine are weighed off, and then mixed in different proportions with soda and chalk. After dyeing, the best and brightest looking sample is taken as standard, and the whole lot of garancine is mixed in the same proportion of soda and chalk, as that standard sample was mixed, thus being sure of a good article.

(To be continued.)

Wool-Washing Machine.

This is a very useful as well as an exceedingly simple and practical invention, and one which cannot fail of being well received. It consists in the combination of a tank, and a circulating



rake or carrier to advance the fibre in the tank. This rake, or as it may be called, carrier, has backwardly yielding pivoted teeth,

supported by a spring, which thus maintains the forward pressure on the fibre. And the teeth being pivoted, the loosening of the fibre is prevented in the backward course of the rake by the forwardly yielding springs. This invention was patented September 15th, 1879, and is No. 227,928. The patentee is Mr. Frederick G. Sargent, Graniteville, Mass.—*American Textile Manufacturer.*

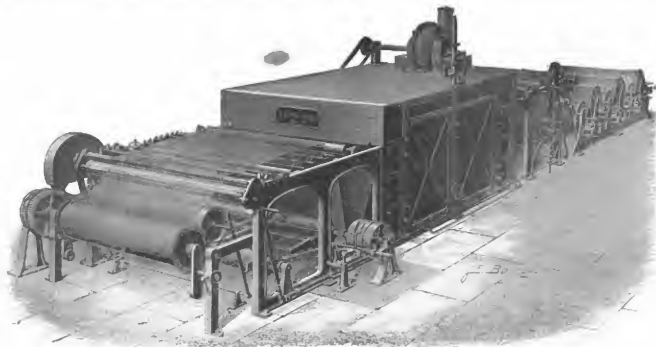
Sizing Machine.

TULPIN BROS.

This remarkable machine performs three different functions, viz., sizing, drying, finishing. It condenses three operations which, heretofore, were accomplished through costly complications. Industrial success belongs to economy in large productions. This apparatus is the illustration of that truism: it has been so ap-

plied with steam, constituting, at the same time, the sides of the drying case. A ventilator agitates the hot air radiated by these hollow casings; the ventilation is generated by a fan or other agitator, blowing against the run at the exit of the yarns, which thus receive cool air, after having passed through the hot department.

The rolling part has the peculiar advantage of giving a certain friction to the yarn by means of a triangular motion operating as rubbers on the yarn. Besides this important point, there are various movements to regulate the delivery without drafts, and a checking arrangement to slack the motion and allow any repair or splicing in case of breaks. The machine, being attached in three different sections, can be separated so as to make a drying or a sizing attachment by itself, in connection with any other existing system. The production of the machine is based on the following



preciated at the Paris Exposition, where Tulpin Bros. had a splendid display of the various labor-saving machines of which they are the sole constructors.

The mode of distributing the size is, in this machine, based on the common principle of dipping fibrous rollers in the sizing composition, which is kept warm and fluid by steam-heating. But the trituration of that size is well organized by a mechanism consisting of, 1st, a vertical agitator having elliptic paddles, which constantly stir the mixture and keep it fine and homogeneous; and 2d, of a cooking compartment producing the glue as fast as required by the distribution.

The drying section of the machine is about 12 yards long, and divided into 7 compartments, in which the yarns move to be dried in a current of hot air. With the circumvolution in this section, the yarn travels a length of over 25 yards and close to hollow flats

figures: length, with the four sizing cylinders, 12 yards; width, inside, 2 yards; production, 1,900 yards per hour.

This machine can be used for tissue-paper as well as for yarns. The perfection of the work is equal to its economy; the size is so pressed out that no dropping or clogging is possible. The threads remain round and smooth through the friction. The absorption of the size through this machine has reached 40 per cent. without impairing the fabric.—*American Textile Manufacturer.*

On Ostrich Feather Dyeing.

BY PAUL ALEX, PRACTICAL FEATHER DYER.

(Continued from page 115.)

Fast colors are not so much looked for in feather dyeing, for the good reason that the color has generally to be changed every season; but browns, blacks, greens, navy blue, and all such colors

should be fast. Then, when the feather becomes soiled it is only necessary to apply soap and water to remove the dirt. When re-colored they are equal to new. A black, properly made, should improve with age, for with every washing it becomes more brilliant. Browns when taken from the bath should be thoroughly rinsed before starching; and it would be advisable to add to the starch-water one or two drops of sulphuric acid, as that helps to expand the flue, as well as to add to the brilliancy of the color. Have the starch-water warm, so that the acid will mix evenly with the water, otherwise it will be apparent after the feathers are dry that they are spotted. It sometimes happens that when the feathers are half dry the shade is not that which was desired, and must be returned to the bath. In such case, care must be taken to have all the starch removed from the flues. A great many dyers will bundle their feathers into a tub of water and attempt to rinse them out, but such practice invariably proves a failure. They then wonder why it is their feathers are so hard to dry, and why it is that the flue will not expand as it should. The reason is that because the starch has not been removed, it has become cooked in the flue. Such a blunder, although very easily avoided, is extremely hard to remedy. When greens are taken from the bath they should not be rinsed, but be starched up in a portion of the bath, hand-warm. If plain starch-water is used it gives the color a faded look. It is not advisable to dry any colors in the sun, nor in a warm room. However, we make an exception in the case of blacks, for they cannot receive too much sunning after the starch has been removed from the flue. In fact, plenty of sun and air should always improve a black.

(To be continued.)

On Mineral Mordants.

(Continued from page 112.)

Subjected to heat in open air the salts of protoxide of tin, from vaporizing acids, gives a residuum which is binoxide of tin. The recombination of globulous tin from the protoxide takes place when this is heated on coal with the blow-pipe. Then, if dissolved, the salts produce the arborescent phenomena called tin tree, or Jupiter's tree, in the solution.

Iron has a peculiar influence on salts of tin in solution with muriatic or acetic acids. A bladder full of this solution being placed in water with a blade of iron will discharge slowly its contents through its pores. This sort of attraction and diffusion is called endosmosis; it permits very fine division of the metallic molecules in case of extreme perfection in dyeing from that mordant, as for extraordinary hues and novelties, which shall be hereafter mentioned.

As in all metallic mordants, the stannates in excess must be removed or precipitated from the goods. Combinations of acids producing nascent hydrogen have a desired influence in this respect. Iron and lead with some acidity precipitate the protoxide of tin. Alkaline sulphides also precipitate it under the shape of bisulphur. Ammonia, potash and caustic soda also precipitate tin salts in forming alkaline stannates, providing there is no excess of acids. All the astringents, principally nut-gall, are good precipitants of protoxide

of tin, and this last is favorably employed now in the European dyeing. Of course these applications are regulated by the shades required. Iodine and ferrocyanide of potassium as well as the simple ferricyanide, are brought into requisition, according to circumstances.

The above indications will suffice to guide the practical dyer regarding the possible requirements of a precipitation of the mordanting salts, which, having a special action on all coloring matters, deserve a careful study as factors of instruction in the art of dyeing.

Between the protoxide and the sesquioxide of tin, the highest state of oxidization the salt can reach, without turning acid, there are intermediaries which are frequently deceptive mixtures. Whenever it is convenient, the best and surest method is to manufacture the salt under the form of protochloride, which is easily obtained. The anhydrous protochloride of tin is produced by the action of dry hydrochloric acid on the pure tin metal at a gentle heat. The hydrated is obtained by dissolving the metal in hydrochloric acid, diluted with an equal bulk of water. It crystallizes in transparent needles containing two equivalents of water. In this simple condition it is a powerful reducing agent on mineral coloring matters, especially on sesquioxide of iron, peroxide of manganese, etc. It can also be used as an antichlor whenever the others, sulphate of soda, ammonia, etc., are powerless.

The manufacture of either of the two oxides of tri-binoxide and protoxide is too complicated and impracticable for any dyeing establishment. But with the protochlorides indicated it is feasible, and may be available in many cases of dyeing and printing at a cheap cost.

The metallic tin is extended to the sulphides' class: the protosulphide and bisulphide of tin. The first is prepared by fusing together metallic tin and sulphur; the second, when prepared in the dry state, is known by the name of *aurum musivum* or mosaic gold, and is used as a bronze powder. It is composed by the fusion of seven parts of the flower of sulphur, six of sal-ammoniac, with a mixture of twelve parts of tin and six parts of mercury. The ingredients are kept in a melted condition until cessation of white fumes. The bisulphate of tin is formed in yellow crystal layers on the top of the fusion.

The mordant principle of tin salts brought to the bioxide state is somewhat of the aluminate character. It is superior in power and solidity because of its purer condition as a homogeneous mineral. Aluminates are frequently impregnated with iron and acid in excess, creating disturbances or short comings not always accounted for in dyeing mishaps. Stannous oxide if properly applied has the advantage of not forming laces and of not altering the coloring matter with which it combines. This is not always the case with other mordants of an aluminate base.

The main properties of this mordant seem to participate of the silicic acid which is one of the most effective and solid astringents known, but generally too expensive in its proper condition to meet the economical results obtained from stannic mordant, now better understood and applied.

Dyers and printers ought to be familiar with the principles

from which the various drugs they use are produced. This knowledge will considerably facilitate and guide the industrial application of the chemicals and bring economy, as well as perfection in the results. In fact, dyers and printers are or must be "executive chemists." This study, as said before, is an outline of the *modus operandi* producing the tin mordants in their various aspects and characters. Without this sort of description or inwardness, the ultimate nature of the ingredient may not be sufficiently understood, and this lack of understanding may lead to serious errors or discrepancies. As it is well known that excess of alkali corrects excess of acid by neutralization, and *vice versa*, the stannate mordants, acid or alkaline, are corrected to the proper point required by the use of these reagents.

The hydrated oxide of tin is obtained in precipitating a solution of stannic chloride by some ammonia or carbonate alkali in excess, neutralizing the acid. The bi-oxide (hydrated) is equally produced in saturating a solution of a stannate of soda with a mineral acid. The oxide is thus alkaline and called stannate, while the bi-oxide is acid and called stannic, corresponding to $\text{SnO}_2 \cdot 2\text{H}_2\text{O}$.

Hydrated bixide of tin or hydrated stannic acid, forms a white gelatinous body, losing its hydration by desiccating it in vacuum, at 150°F . As a fresh precipitate it dissolves in caustic alkalis, in ammoniacal solutions and in acetic acid. Desiccated at a higher temperature than 200° it becomes less soluble in acids. Subjected to calcination it becomes anhydrous and insoluble in concentrated acids. It must be then reduced by the reducing agents mentioned for the treatment of the protoxides—the sulphides, etc. Sulphur heated with bixide of tin produces a bi-sulphur of tin (gold) in liberating sulphurous acid.

Since the discovery of artificial color from mineral sources, the use of the stannic salts have mostly been concentrated on silk dyeing. The nitro-muriate, the oxy-muriate and the protochlorate of tin are prepared in view of weighting as much as mordanting the precious filament. These various oxides suit the purpose more than any other mineral mordant. They give weight without altering the fabrics and permit dyes—white, light, dark and black—better than any other mordants, on account of its colorless and neutral action as a coloring proper. Another peculiar advantage of this mineral delicate mordant is that of imparting density and of loading internally the silk without increasing the volume of the valuable fibre. This has been the aim and desideratum long sought for by enterprising traders. Hence, the success of tin mordants. These properties, besides the delicate solidity of the coloring combinations, are accounted for from the extreme molecular division of the metal in solution without losing its extraordinary astringent power. The fact that it can be diffused and atomized by the endosmose process, proves its valuable subtleness and minuteness as a mordant.

Suggestions on Feather Dyeing.

(Continued from page 117.)

The animal character of feathers having been explained in the preceding article, and the exclusion of strong alkali being understood on account of its solvent and destructive influence on vitro-

genous substances, we will proceed with practical remarks on the dyeing processes of various colors:

Garnet shades are the most produced, for the reason that they are of the easiest and cheapest class. The scale of the garnet colors comprises the dark, the red, the violet, the medium and the light shades. They are all produced from orchilla, which, from its ammoniacal and acidulated nature, suits the material, especially in this scale. Being given a specimen shade as a guide, orchilla can be easily and promptly brought to any point desired—from red, yellow to violet, forward and backward. It is a matter of acidulation, giving reds more or less yellowish, and of rinsing successively in cold water and hot water, alcalinized with carbonate of soda to certain degrees producing the range of colors desired by vivification.

These valuable qualities in orchilla are so important that no substitute has yet been found to supersede the rich coloring vegetable. It seems able to resist the tide of artificial discoveries which revolutionize the tinctorial domain like so many other institutions. Madder, wood colors, and even the prized indigo are more or less dethroned by the audacities of chemistry, finding in nature superior or cheaper ingredients to take their long honored places. But so far, the humble *rosella* is immovable, from its useful and unexcelled position. Still, the orchilla dye is not perfect nor solid. It does not long resist the fading action of air, dampness and of carbonic acid. But so far, feathers cannot do much better, and as fashion changes as quick if not quicker, there is no special importance in its instability.

Dye baths of orchilla can be made from the extract of the plant or from the paste. It must be well diluted cold, and then boiled for 15 minutes. Sulphuric acid diluted with water is added in proportion to the shade desired, as above mentioned.

It might be observed that feathers should be classed according to their growing places. The feathers from the collar and from the rump of the bird are more tender and take the dye with more facility than the others. Moderate heat is sufficient to have the shade uniform. As orchilla raises slowly, the feathers must be left in the bath long enough—from one to two hours, at a temperature of sixty to one hundred degrees. The coloring matter remaining in suspension, the bath can serve a certain time, so far as it does not ferment. It turns black in fermenting; then it could be used for maroons, etc.

Once well dyed in the garnet bath, the feathers are rinsed in fresh water, acidulated with sulphuric acid, if the shade must be red-yellow; in simple water, cold or tepid, if it must be violet. For a pronounced violet, a small addition of carbonate of soda gives the shade. Should the violet shade be deeper than the sample-guide, an acidulated rinsing will bring it to a point.

It is important to rinse moderately in simple water without acid, since it discharges or discolors easily. Acid is the astringent power which holds the coloring matter on the feather. In general the shade should be near enough in leaving the dye-bath both to avoid much rinsing and tinkering. In fact, in using extract, there should be no necessity for it in the hands of a practical, experienced dyer. When the orchilla is used in paste, there may be more requirements of rinsing, on account of the fichen filament or residue

frequently floating and depositing on the feather. By itself, or-chilla gives a scale of good garnets. But when deeper cast is required, carmine of indigo is added in solution. As this bites readily on the feather, it must be poured in light dilutions and gradually while the bath is boiling. In this case there must be some free acid in the bath, otherwise the carmine indigo does not take. The word free acid, means that if any acid has been put in a certain time previous to the carmine-indigo addition, it may have been neutralized even while the bath is vividly red. In this case some acid must be previously put in, but not while the carmine indigo is in, otherwise this might precipitate in excess on the feather and overdo the dyeing. Accidents of this sort occurring, the feather must be taken out and subjected to a discharging boil. The excess of coloring matter is thus removed. Should it resist, a carbonate or a soap bath might be required. When this treatment has no satisfactory effect, the feathers must be subjected to a light bath of sulphuric acid, heated to fifty degrees, in which a dissolution of bichromate of potash, 20 grains per kilo of feathers, is poured with agitation. A few minutes in that bath brings the feathers to their original condition to be dyed. Certain sorts of feathers absorbing in excess, are thus treated in redressing.

(To be continued.)

Kid Glove Dyeing.

Kid glove production is another industry in a progressive way of development in the United States. It proves to be an immense trade, daily increasing. No country in the world consumes so many kid gloves as does the American Union, and several large factories, originated under the protective fostering of the tariff, are as busy as their capacity permits them to be. The great drawback in this industrial sphere lies in the difficulty of procuring the skillful labor required to equal European products. In this short-coming, the dyeing of the kid skins has a share which justifies the following study: The skins for glove making are classified in several sorts, according to quality and perfection. The best are dyed on the surface side. The others are dyed on the flesh side, in order to disguise the defects or imperfections of the right side.

The skins selected for dyeing are first subjected to the purgative process. This consists in an alkaline bath in which a sort of fulling extracts the excess of oily matters contained in the skins. It also endows them with the softness and uniformity required for a fitting glove. Salsoda and warm water constitute that softening and purgative bath. The alum and tannic acid used in the tanning operation are eliminated by this process in adding some white soap to the bath. Whenever some skins get meagre and spongy by an excess of discharge, they are restored to a good body by fulling on them a paste composed of flour and yolk of eggs in water.

There are several methods for dyeing kid skins; those mostly in use are the *dipping* and *planking*. This last is the best for the first quality skins. Having been purged, washed, and dried, they are stretched on a stand forming a donkey's back. This surface is made of smooth zinc or lead. All the *plys* and wrinkles being suppressed with a wood scratcher the dye is applied carefully on the surface with a smooth and long hair brush. Any ordinary dyeing liquor, somewhat thicker than for vat dyeing is good. After the first application, the skin is removed to the drying room, and brought again when dried for another coating, until sufficiently shaded.

Between each coating they are subjected to the friction of a pumice stone, when a smooth *glace* surface is desired. This is generally done for black gloves. Two coatings are the average application for ordinary gloves, but for fine qualities three are desirable.

A skilled dyer, knowing how to prepare the dye, and having efficient help, can turn out a good many skins in rotation. The important point is to preserve the skin from under penetration, and stains of the dye inside. The glove must be immaculate on the flesh side, and perfectly dyed on the outside surface. The art consists in all these details of carefulness and also in a sufficient depth of coloring to allow the sewing and stitching without any white spots showing on the stitches.

Old Gloves Re-dyed.—The glove cleansing industry is now improved to the point of re-dyeing old gloves, and of making them almost as good as new. The process is simple and easy, viz.: The glove is first subjected to the cleansing bath, made of benzine and crystal soda. Half an hour's agitation in it generally prepares it for a ready washing and cleaning in clear water. This being done so as to remove all greasy matter from the skin, the glove is put in form. There it receives a dye brushing with a soft woolen pad, or a small brush impregnated with the coloring matter. After this first coating a soluble mordant of alum is likewise applied. When about dried, the skin receives another coating of dye. Violet aniline, orchella, or any other dark shading colors, suit the majority of old gloves more or less dilapidated on the surface. Before being dried, it is polished all over on the form with a glass roller, finishing the surface. Yellow colors can likewise be applied on old gloves. Alum mordant and vegetable yellow extracts accomplish the object. The important part of this economical treatment is in the complete stretching of the glove on a proper hand form. Some improving polish is given by using a smooth fine cork enveloped in a piece of blue wool cloth. This brings up the grain of the leather much better, when the stretching is well observed.

Garment Dyeing and Scouring.

(Continued from page 115.)

The industry of garment renovation is based on two preparatory processes, the wet and dry cleansing. The first is done by alkaline washing; the second by hydro carbon applications, such as benzene, on the soiled parts of the garment. As in every trade and profession, the scouring art is divided into two antagonistic systems. Many "professionals" pretend that the new dry method, consisting in removing by the cheap benzene all the local stains and soiled spots of a suit, is far preferable to the old system, consisting in washing in detergents the whole piece of garment. They claim the advantage of minimum labor and cost with less deterioration of the cloth, shape, finish, etc. The adverse party, favoring the radical cleansing, retorts that any garment worth cleansing must undergo a thorough operation to be renovated properly; that it is the only honest way of treating visible and invisible dirt, and that the cost is surely the lowest, while the result is certainly the highest in merit, etc.

This interesting controversy has been carried far enough to culminate in a fiery test of the relative merits of the two advocated principles. Two selected suits of cloth equally deserving a radical extraction of filth, have been subjected before experts to the contrary methods. One was first beaten to death to raise the dust and

exhibit the stains, soiled spots, etc., which were marked with white soap. Then a scourer, armed with a solid scrubbing brush, rubbed vigorously the marked places with a solution of carbonate of soda. This being done conscientiously the brushed spots were rinsed thoroughly in warm water. Then another brushing with a softer brush, and another alkaline liquid was done by another man of a higher sphere. From this operation the garment went into a sapary bath to be thoroughly washed as a shirt. Hence, it was rinsed, hydro-extracted, and stretched as usual. When dried it was ironed and finished by another man still higher in the scouring community. The whole cost of the piece (a pantaloen) was calculated, debated and admitted at 40 cents.

The operation of the benzoinhydrous process went on with all the gravity due to such an important issue. The piece of garment, after an investigation ascertaining its marked qualifications to the treatment, was beaten to death as the other was. The stains and soiled spots exhibited themselves as the others did. Then marked with white soap and vigorously rubbed with a hard brush saturated with benzine instead of an alkaline solution. After an outside and inside brushing with a copious flow of benzine running from the brush on the pants and from the cloth into a bucket, the garment went into several fulling, and rinsing, as a shirt. Then subjected to the hydro-extractor, as the other. The ironing and finishing being done as usual, the whole cost was calculated, debated and admitted at 41 cents. This one cent of difference was accounted for from the cost of cream of tartar required to remove a colored stain which was respected by benzine, dissolving only fatty or oily spots.

This remarkable contest has closed a great and fiery dispute in proving once more that war-like divisions between men are generally of a hair size, when looked at close enough.

The garment scouring process being sufficiently illustrated by this example, we will proceed by resuming practical indications on redyeing ladies apparel.

BLACK SILK DRESS, AFTER CLEANSING.

First Bath.—Cyanide, (red) 65 gr.; sulphuric acid, 20 gr.; turn in the dress for 20 minutes.

Second Bath.—Composition of the first bath, one glass; tin salt, 125 gr. Turn in this bath 20 minutes and rinse; then return to the first and seconds until the required shade is obtained. Rinse in acidulated water lastly.

CRIMSON ON CHINA CRAFT SHAWL.

Pass the shawl through a bath made of 250 gr. alum in 15 liters water; leave it in 2 hours and rinse. Then make a bath of 125 gr. cochineal (crude and pulverized) boiled with 35 gr. cream of tartar and 2 nutgalls. Turn in the shawl for 30 minutes. If any dark streaks show, add a little tartar in solution, and keep it in, raising to boil gradually. Rinse and dry.

BLEACHING OF A CHINA CRAFT SHAWL.

Remove the greasy spots with benzine, saturate thoroughly with cold water, pass successively in two soapy baths of white soap, rinse 4 times; warm and cold. Make a bath of sulphurous acid, half acid half water. Keep in a while, and rinse in sulphuric acid water. Pass again through cold and warm water. Prepare a bath

of clear water with 5 gr. indigo in solution, 3 gr. cochineal in ammonia; 40 gr. alabaster powder. Pass the shawl in that bath for 15 minutes—20 minutes if embroidered. Pass in light gelatinous bath; remove and finish at once, as usual.

CORINTH ON WOOL (30 METERS DAMASK FOR FURNITURE.)

The tissue being previously well secured and washed, is boiled 1 hour in a bath of alum, 500 gr.; tartar, 500 gr.; then add: orchilla, 1 k.; carmine indigo, 250 gr.; sulphuric acid, 15 gr. Boil until desired shade and rinse and dry.

Testing Ultramarines.

BY T. MOREL.

The qualities required in a good ultramarine are a brilliant but dark shade, great fineness, coloring power, and resistance towards acids or alum. In testing ultramarines it is always necessary to compare them with a standard sample, and thus determine their value by comparison.

In order to test for shade, put a small quantity of the sample of ultramarine on a piece of white paper, then flatten and smooth it by means of a knife. Now put a very small quantity of the standard sample in the middle of the flattened sample of color, and pass the knife over again, when the difference in the shade will at once become apparent. The result may be confirmed by repeating the experiment, by first placing the standard ultramarine on the paper, smoothing over with the knife, and then in the middle put a pinch of the sample to be tested, and smooth again. In this way, also, any difference in the sample and standard color will become marked.

The fineness of a sample of ultramarine is usually estimated by feeling with the fingers; no other method can be recommended. The coloring power may be ascertained by mixing one part of ultramarine with six parts of white, either kaolin (china clay), or sulphate of barytes, and comparing with the standard, similarly mixed with an equal amount of white, in the same way as described for the unmixed colors.

For some purposes it is necessary that ultramarine should stand acids; for instance, for printing on calico by means of albumen, or thickenings, which are capable of becoming acid by decomposition. As oxalic acid is a product of the decomposition of albumen, this acid is taken to test the resisting power of ultramarine, the method fixed being the following: 50 grammes oxalic acid are dissolved in one litre of water; five cubic centimetres of this solution are put into a test tube with five decigrammes of the ultramarine to be tested, while five cubic centimetres of the oxalic acid solution are mixed with five decigrammes of the standard color in another test tube; both are well shaken, and the changes which take place are observed in both.

The resistance to the action of alum was an important quality required from an ultramarine to be used in the paper manufacture; now it has been proved that if the paper has been manufactured under good conditions, ultramarine of the most delicate colors is not attacked. However, in order to test the resistance against alum, fifty centigrammes of the color to be tested is put in a test tube, and well shaken with fifteen cubic centimetres of a saturated alum solution, and the change which takes place is compared with the one shown by the standard color treated in the same way. It is a mistake to suppose that if an ultramarine will resist the action of alum it will do the same with acids; this is not always the case. For

paper makers, the ultramarine must have a good coloring power, and be as fine as possible; further, it must resist alum, if much of the latter is employed. For printing, also, it must be very fine; this must be ascertained, especially for deep shades, which generally are the coarser. The resistance against acids should also be considered, being a necessary and valuable quality. The extent of the tinting property is tested by passing some cotton yarn into a tinting bath, prepared with one gramme blue, and two hundred cubic centimetres water, the latter dried, and by feeling with the finger if it adheres to the fibre, the tinting power is estimated.—*Moniteur Scientifique*.

Proved Recipes.

BY "CALICO PRINTER."
BLUER.

Prussiate Blue:—

- 7 gallons of Water,
- 6 lbs. of Starch,
- 1 " " Sal ammoniac,
- 3 gallons of Tin pulp. Then add
- 9 lbs. of Yellow prussiate of potash,
- 9 " " Red prussiate of potash,
- 8 " " Tartaric acid. Then add
- 3 fl. oz. of Sulphuric acid, 175° T., and
- 1 lb. of Oxalic acid dissolved in
- 1 pint of Water. Mix well, and ready.

Tin Pulp:—

- (1) 4 lbs. of Yellow prussiate of potash,
- (1) 6 gallons Water (boiling). Dissolve and cool.
- (2) 4 lbs. of Tin crystals.
- (2) 6 gallons of Boiling water. Dissolve and cool.

When cold add 1 and 2 together, and then filter to a pulp.

Fast Indigo Blue, to raise through alkaline solution:—

- 6 lbs. of Ground Indigo,
- 5 " " Tin granulated,
- 2½ gallons of Water,
- 2½ quarts " Caustic soda, 66°

Boil 1½ hours, sieve, and wash the tin with

- 1 gallon Water. To this add
- 2½ quarts of Muriate of tin liquor at 120° T.,
- 1 " " Lemon Juice, 20° T.,
- 3 gallons of Gum water.

Pass through a sieve, then grind two days in the mill, then strain for printing.

Aniline Blue, to print with red mordants, etc., for dyeing:—

- 1 gallon of Water,
- 1 " " Gall liquor, 16° T.,
- 2½ lbs. of Tannic acid,
- 4 " " Starch,
- 1 " " Dark British gum. Boil; when cool add
- 1 " " Citric acid. Cool, and add
- 8 ozs. of Blue marine, dissolved in
- 1 quart " Acetic acid, 8° T. Strain, and ready.

Aniline Blue, for steaming:—

- 2 gallons of Water,
- 2 quarts " Acetic acid,
- 2 lbs. " Tannic acid,
- 2½ " " Starch. Boil; then add
- 8 ozs. " Citric acid. Cool, and add
- 6 " " Aniline blue, to shade, dissolve in
- 1 quart " Acetic acid, 8° T.

Anthracene Blue, on cloth prepared with olefine oil:—

Thickening:—

- 1 gallon of Water,
- 1 lbs. " Starch,
- 4 ozs. " British gum,
- 1 pint " Olive oil.

Color:—

- 1½ gallons of Thickening,
- 1 quart " Anthracene violet,
- 1 gill " Acetate chrome, 20° T.,
- 2 " " Chloride of calcium, 20° T.,
- 2 " " Bisulphate of soda, 30° T.

Steam Alizarine, or Extract Style.

BY "CALICO PRINTER."

Extract Chocolate. Thickening:—

- 3 gallons of Water,
- 1½ lbs. " Starch,
- 3 quarts " Acetic acid, 8° T.,
- 1 " " Olive oil.

Color:—

- 1 gallon " Thickening (above),
- 1 " " Madder extract,
- 2 quarts " Chrome solution.

Chrome Solution:—

- 12 lbs. " Sulphate of chrome.
- 10 " " White sugar of lead, dissolved in
- 3 gallons " Boiling water. Let it settle, and use clear liquor.

Extract Purple. Color:—

- 3 gallons of Thickening for chocolate,
- 3 quarts " Purple alizarine,
- 1 " " Iron liquor, at 20° T.,
- 1 pint " Acetate lime, 20° T.,
- 2 gills " BBBB manure liquor.—*Eng. Tex. Mfr.*

White and Red Reserve Under Aniline Black.

White Resist.—Dissolve in hot caustic soda so much white arsenic as it will take; make up to 58 to 61° B.; thicken this with gum substitute.

Red Reserve.—Sulphocyanide of alumina, thickened with gum-water or solution of alumina in caustic soda showing 32° B., thickened with leigome.

Both reserves are printed, the pieces are dried, aniline black is printed on, and the pieces aged. They are now passed through two dunging baths, at 167° F.

First dunging bath—

- 100 galls. water,
- 3 1-5th galls. cow dung,
- 4 lbs. chalk,
- 2 lbs. sal ammonia.

Second dunging bath same as first, at 157° F.

It is then washed, dyed with alizarine, and twice soaped.—*Allgemeine Zeitschrift für Textil-Industrie*.

Alizarine Carmine.

This compound, which is more correctly named sulphoalzarate of soda, is obtained by neutralizing sulphoalzaric acid with soda ash or caustic soda, dissolving this product in water, and purifying it by precipitation with common salt. As a derivative of alizarine it possesses great fastness and permanence, and is every way calculated to banish madder from its uses in woolen dyeing and printing. It is admitted, indeed, that the new azo dyes (ponceau, orange, and tropéoline) give more fiery, brilliant shades, but their fastness in fulling cannot by any means be guaranteed to the same extent as that of alizarine. The use of alizarine carmine, in addition to the love of the dyers for their old customs, had to encounter the peculiar difficulty that in order to obtain a good article, thoroughly pure, dry alizarine must be employed, otherwise brownish-red, dirty shades were obtained. But the production of the color from pure alizarine is so expensive that it cannot compete with the modern azo colors. S. Fischer, chemist at the alizarine works of Prizbram & Co., has succeeded in obtaining the pure coloring matter, even from the worst alizarine in the market, and has thus paved the way to its substitution for madder in woolen dyeing.—*Zeitschrift Textil-Industrie*.

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SPECIAL NOTICE.

IN ORDER TO AVOID all difficulties hereafter, as well as to facilitate our business, our agents will be required to furnish a postal card addressed to this office, whereby our patrons can notify us directly of what money they have paid an agent, and in what State such payment was made. We will thus be kept duly posted as to the actual state of our business at all times. It is particularly requested that such postal card be forwarded immediately on payment being made to the agent.

WE CALL THE earnest attention of our readers of the tinctorial profession to the article, *Blue of France*. It is a remarkable and useful study on the various modes of producing good Prussian blue dyes. The essay is, beside its practical value in relation to blues, very suggestive on the general technicalities of the chemical effects of tinctorial matters.

We also publish, as usual, a copious quantity of instructive matter on practical dyeing and printing for tissues, hats, gloves, artificial flowers, feathers, birds, skins, etc.

THERE IS AN ABUNDANCE of quackery in dyeing, as well as in other arts, and whatever are called *secrets* are for the most part unprofitable ventures to those who have the temerity to buy them. We would not be understood however, as desiring to decry the principle of retaining for one's own use, that which is his own discovery,—not at all—we know that which is a man's property he has perfect power over to keep to sell, or to dispose of as he may think fit. But, surely, if any discovery be a really meritorious one, the secret may be turned to account by the discoverer himself, and the proof of its value worked out by his own hands. Let him keep his secret, if he will, and make the most of it. To a certainty, should it prove to be all that he represents it, there is always money ready for the communication of the secret. But, how frequently does it happen that the interchange proves detrimental to the success of the secret recipe. In other words, no two men work alike; and that which comes like a charm from the hands of the dis-

coverer, falls with disappointment from the efforts of his partner. This has been a frequently experienced fact, and one which should have the effect of rendering the purchaser of a secret recipe very cautious.

IT IS SERIOUSLY proposed in England to organize a society or institute, for the promotion of textile art training, by the combination of chemistry as a study with textile art and dyeing, to the end that the chemist may find this a lucrative as well as a highly useful branch to devote himself to. Here, in America, it is a difficult matter to get a chemist who is sufficiently posted in textile matters to be able to throw practical light on any question which calls for the aid of science. It is true we have able chemists amongst us, but their attention is devoted to branches of their profession for which their aid is in more demand, and, of course, it is in that direction their studies are applied. The *Chemical News* thus introduces the subject:

"We learn that meetings have been held at Liverpool, Manchester, and Widnes to consider the formation of a society or institute for promoting the application of chemical science to the arts and manufactures. It will, we think, be admitted that some organization which should afford those interested in industrial chemistry an opportunity of exchanging ideas, and discussing professional questions would be of great value to the interests affected, and to the trade of the country at large. Such organizations, slightly varying in their respective scopes and characters, exist abroad, and have proved exceedingly useful. But in England, manufacturing chemists hitherto have to a very great extent held aloof from each other, and have actually shunned the interchange of opinions and experience. Hence, both societies and journals of a technical character have met with very scant encouragement. But it is now very widely felt that this mutual isolation is one of very few causes which are placing our industrial eminence in jeopardy, and which, in the chemical arts as well as in other departments, are enabling foreign nations to steal a march upon us. The formation of some such society as the one proposed we should therefore regard as a hopeful sign, and should be prepared to give it every support in our power."

Now, we have just as much want of such an institution as England; for, if that country desires by such aid to save her textile industries from the jeopardy they are in, surely we can get all the intelligent assistance we want, to help us forward in our growing prosperity. Every effort made to save a failing trade or to advance a stagnant textile interest should be a significant prompt to our vigorous young nation to increase its pace and not be content with merely holding its own. We have more than once urged the necessity for study amongst our dyers, and now we urge the application of the study of our chemists to dyeing as a *specialty*. The discovery of the beautiful derivatives of coal-tar too plainly shows what may yet be done by scientific investigation, and to chemistry we are to look for progress. Experiments founded on guess-work are but wanderings in the dark, whereas investigations enlightened by scientific knowledge are sure to come out profitably in the end. We really see in the proposed association in England, an invaluable idea which it would be our interest to take up and follow out.

DYEING DEPARTMENT.

* THE MONTH'S PRACTICAL RECIPES.

The following practical recipes, like all that will appear in this department, are certified as reliable and warranted to come out satisfactorily, provided the proportions are strictly adhered to, and the manipulation be workmanlike.

DIRECTIONS, NOTES AND COMMENTS.

☞ We have frequently been asked why we give the names of the makers of the aniline and dye stuffs we use when publishing the recipes accompanying our insets. The reason is: We can speak with authority for those we actually test; where anilines and dyestuffs of the same color, manufactured by other firms, may be equally good, but when treated according to our recipe, may not give similar results. In giving the name of certain manufacturers, therefore, we would not be thought partial to them. Each has his own mode of producing desired effects with his own dye stuffs.

Recipe No. 87.

TAN ON LOOSE WOOL. (STANIS FELLING.)

- 100 lbs. Clean Wool.
- Boil 2½ lbs. Extract Archil,
- 1 lb. Madder,
- ½ lb. Extract Fustic,
- 8 lbs. Alum,
- 2 lbs. Argols.

Enter wool at the boil, boil for one hour, and done.

Recipe No. 88.

LIGHT RED ON RAW COTTON FROM THE BALE. (STANIS FELLING.)

- 100 lbs. Cotton, well tensed.
- Put down for 1 hour at boil in 10 lbs. Sumac.
- 2nd Bath—Oxy-muriate of Antimony 2" T. for 15 to 20 minutes, wash well.
- 3rd Bath—10 lbs. Hypernic,
- 14 lbs. Yellow Spirit.

Enter at 180° F., turn or rake for 15 minutes while raising temperature to boil, wash and done.

Recipe No. 89.

MEDIUM DRAB ON RAW COTTON FROM THE BALE. (STANIS FELLING.)

- 100 lbs. Cotton well tensed.
- Boil 10 lbs. Sumac,
- 1 lb. Extract Fustic,
- 2 lbs. Extract Logwood,
- Enter cotton at the boil, boil for 1½ hour, cool down to 160° F., then add 1½ lbs. Blue Stone.
- Raise up to boil, boil for 15 minutes, cool, wash, and done.

Recipe No. 90.

BLUE ON RAW COTTON FROM THE BALE. (STANIS FELLING.)

- 100 lbs. Cotton well tensed.
- Boil 5 lbs. Sumac,
- 3 lbs. Logwood, ground.

*The dye woods and extracts used this month, have been furnished by Jas. L. Morgan & Co., New York.

†Yellow Spirit is made by dissolving 2 ozs. feathered 1½ to every 1 lb. muriatic acid.

Enter cotton at boil, boil for 1 hour, sadden in the same tub with 12 ozs. Copperas, take out, cool well, enter second bath of

- 5 lbs. Alum,
- 2½ lbs. Carmine of Indigo,
- 1 lb. Extract Logwood,
- ½ lb. Oxalic Acid.

Boil for ½ hour, wash, and done.

Recipe No. 91.

RUBY ON RAW COTTON FROM THE BALE. (STANIS FELLING.)

- 100 lbs. Cotton well tensed.
- Boil 6 lbs. Cutch,
- 1 lb. Blue Vitriol.

Enter Cotton at boil, and work it for ½ hour.
2nd Bath.—Boil 12 lbs. Hypernic,
2 quarts Oxy-Muriate of Tin.

Boil cotton for 1 hour, wash, and done.

Recipe No. 92.

FLESH COLOR ON WORSTED.

50 lbs. Yarn.

Clear the liquor well by passing a lot with the required mordant of Glaubersalt and Sulphuric Acid. Now add
5 lbs. Glaubersalt,
1 lb. Sulphuric Acid.

1 oz. Scarlet RRR. { Meister, Lucius & Brueening, Hoechst.-A.-M.
{ Lutz & Movius, N. Y., Boston and Philada.

Enter yarn at 150° F., turn well, heat up to 180° F., and turn to shade.

Recipe No. 93.

DARK BROWN ON WORSTED.

75 lbs. Yarn.

- Boil 2 lbs. Alum,
- 10 lbs. Glaubersalt,
- ½ lb. Red Tartar,

18 ozs. Maroon S. { Badische Aniline and Soda Fabrik.
8 ozs. Fast Yellow, { Wm. Pickhardt & Kuttroff,
2 ozs. Orange A. { New York, Boston, and Philada.

12 lbs. Indigo Paste.

Enter yarn at 180° F., raise to boil, and boil for 1 hour.

Recipe No. 94.

SCARLET ON GERMANTOWN WOOL.

50 lbs. Yarn.

- Boil up 6 lbs. Glaubersalt,
- 1 lb. Sulphuric Acid,
- 12 ozs. Scarlet RR. (A. Poirrier, Paris).

Enter at 160° F., raising temperature to boiling, and turn to shade.

Recipe No. 95.

ALKALI BLUE ON WORSTED.

50 lbs. Yarn.

Boil 8 ozs. Alkali { Meister, Lucius & Brueening, Hoechst.-A.-M.
Blue, R. Extra, { Lutz & Movius, N. Y., Boston, and Philada.
Add 2 ozs. Borax.

Enter yarn, run for 1 hour, wash out, enter 2d bath at 180° F., containing 1 lb. Sulphuric Acid; give 5 turns, and wash. This blue is the strongest we have tested up to date.

(Continued on page 135.)

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89



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PRICES CURRENT.

PHILADELPHIA, JUNE, 1880.

DYES AND DYE-STUFFS.

Acetic Acid.....	per lb. \$	0 60	8
Albumein, Blood.....	do	50	60
Albumein, Eggs.....	do	85	95
Alum, ground.....	do	2	02 1/2
Alum, lump.....	do	2	23
Anatto, prime.....	do	30	40
Annattoine.....	do	1 30	1 50
Aniline Oil, English.....	do	26	30
Aniline Oil, French.....	do	26	36
Aniline Salt, crystals.....	do	22	30
Aniline Salt, cake.....	do	22	30
Archil Liquid, best.....	do	16	25
Argols, crude Oporto.....	do	7	10
Argols, crude Sicily.....	do	16	20
Argols, refined Gray.....	do	28	32
Argols, refined Light.....	do	30	33
Aqua Ammonia.....	do	28	32
Aqua Ammonia, F. F. F. F.....	do	6	6
Aurine.....	do	75	90
Barbery Root.....	do	5	5 1/2
Barwood.....	do	13	14
Bi-Chromate Potash.....	do	23	14
Bleaching Powder.....	do	2	3
Borax, refined.....	do	10	13
Brazil Wood.....	do	3	5
Blue Vitriol.....	do	7	8 1/2
Brimstone, roll.....	do	3	3
Cannwood, pure.....	do	8	12
Cannwood, No. 1.....	do	8	12
Carbonate of Ammonia.....	do	20	21
Caudic Soda, 60 per cent.....	do	4	5 1/2
Caudic Soda, 70 per cent and over.....	do	24	40
China Clay.....	per ton	50	95
Citric Acid.....	per lb.	90	95
Cochineal, Honduras.....	do	70	75
Cochineal, Mexican.....	do	65	70
Cochineal, Black Tezcu.....	do	75	75
Copperas.....	do	1	1 1/2
Cream Tartar, crystals.....	do	36	38
Cream Tartar, powdered.....	do	36	38
Crimson Spirils.....	do	13	14
Cudbear, pure.....	do	20	25
Cudbear, No. 1.....	do	15	16
Cudbear, No. 1, French.....	do	23	28
Cutch.....	do	10 1/2	11 1/2
Dyei Divi.....	per ton	50	75
Dihydro Acid.....	per lb.	10	10 1/2
Extract Fustic.....	do	13	20
Extract Hypericin.....	do	19	24
Extract Indigo.....	do	16	18
Extract Logwood, bulk.....	do	9	9 1/2
Extract Quercitron.....	do	7	9
Flavine.....	do	29	30
Fustic, Cutch.....	do	1	2
Fustic, Maracalla.....	do	1	2 1/2
Fustic, Savanna.....	do	1	2
Gambler, pale.....	do	1	2
Gambler, dark.....	do	1	2
Green Ebony.....	do	4	6
Hypericin.....	do	3	4
Irish Moss.....	do	4	5
Iron Nitrate.....	do	6	8
Indigo, Auxiliary.....	do	10	12
Indigo, Bengali.....	do	1 45	1 85
Indigo, Caracena Blue.....	do	1 35	1 10
Indigo, Guatemala, fine.....	do	1 35	1 60
Indigo, Madras, fine.....	do	1 35	1 65
Indigo, Manila.....	do	85	93
Lac Dye, fine powdered.....	do	18	18
Lac Dye, good powdered.....	do	10	15
Lima Wood.....	do	3 1/2	4 1/2
Logwood, Guayaquil.....	do	1	2
Logwood, Honduras.....	do	1	2 1/2
Logwood, Laguna.....	do	2	2 1/2
Logwood, St. Domingo.....	do	1	1 1/2
Madder, Dutch.....	do	12	12
Madder, French.....	do	2	2 1/2
Muple Bark.....	do	2	2 1/2
Marble Dust.....	per bbl.	1 50	1 75

Myrabolans.....	per lb. \$	5	6
Muriatic Acid.....	do	11	12
Muriate Tin.....	do	19	22
Muriate Tin, strong.....	do	19	22
Muriate Tin, oxy.....	do	19	20 1/2
Muriate Tin, crystals.....	do	21	22
Nickwood.....	do	21	3
Nitrate Iron, pure.....	do	7	9
Nitrate Lead.....	do	11 1/2	12 1/2
Nitric Acid, (Aqua Fortis).....	do	7	7 1/2
Nitralite, Aleppo.....	do	26	28
Orbelle.....	per lb.	16	22
Oxalic Acid.....	do	10	11
Pearl Ashes.....	do	6 1/2	7 1/2
Peruvian Berries.....	do	2	3
Pierle Acid.....	do	46	50
Potashes.....	do	5	5 1/2
Prussiate Potash, yellow.....	do	27	31
Prussiate Potash, red.....	do	65	70
Quercitron.....	do	1	2
Redwood.....	do	2	2 1/2
Red Sanders.....	do	18	20
Muriate of Soda.....	do	18	20
Starch, Corn.....	do	4	6
Starch, Potato.....	do	6	6 1/2
Starch, Wheat.....	do	6	6
Safflower.....	do	24	44 1/2
Safflower extract.....	per bot.	7 100	8 000
Sal Ammoniac.....	per lb.	12	13
Sal Soda.....	do	11	2
Sajau wood, ground.....	do	2	3
Soluble Blue.....	do	60	90
Sugar Lead, brown.....	do	103	11
Sugar Lead, white.....	do	22	24
Sunape, Sicily, according to grade.....	per ton	75 00	80 100
Sunape, Va.....	do	50 00	55 00
Soda Ash.....	per lb.	2	2 1/2
Sulphuric Acid.....	do	11	12
Tartaric Acid.....	do	55	60
Terra Japonica.....	do	4	6
Turnerite.....	do	7	7 grd. 8
Ultramarine.....	do	13	25
Vermilion.....	do	39	35
Wood.....	do	10	12

BUSINESS OPPORTUNITIES.

Y. J. BIRD, AUTHOR OF THE DYE-FAST HAND BOOK, is prepared to furnish reliable prices in any branch of Dyeing and will have pleasure in matching to any color or shade for special customers, of his new Aniline Colors. See advertisement, page 6.

Address, 217 1/2 Marks Ave., Brooklyn, N. Y.

On New Coloring Matters.

BY W. V. MILLER.

A recently published number of *Her Graser's* has induced me to give in brief the result of an investigation which I began some months ago, but which is not yet completed.

The object of my researches was a coloring matter which has been met with in the market for the last half-year under the name of *Biebrich scarlet*, and which, according to its analysis and its products of decomposition, belongs to the class of dyewares mentioned in *Graser's* specification. The coloring matter in question is evidently prepared by diazotizing and combining with *δ*-naphthol the "acid yellow" of commerce, a mixture of the various sulpho-acids of the amido azobenzole, first obtained by Griess and Martius. As the acid yellow is not a unitary, individual compound, the coloring matter obtained from it is likewise not unitary. I found, in fact, a mixture of red colors, with which was mixed a yellow, resembling in its behavior "mandarine yellow." The author attempted to prepare the dye synthetically, and obtained a red coloring matter with all the properties of *Biebrich scarlet*.

The pouceau S of Pfaff, now prepared here on the large scale, is obtained by the action of diazotized acid yellow upon naphthol disulpho-acid.—*Berichte Deutsch Chem. Gesellsch.*

(Continued from page 130.)

Recipe No. 96.

DARK GOLDEN CARMELITE ON WORSTED.

50 lbs. Yarn.

Dissolve 5 lbs. Glaubersalt,

1 lb. Alum,

1 lb. Sulphuric Acid,

6 ozs. Dark Golden Carmelite.

{ Clayton Aniline Co.,
Manchester, Eng.
Henry A. Dupee,
Boston and N. Y.

Enter yarn at 150° F., bring to boil, and turn to shade.

~~See~~ This aniline is valuable on account of its strength, and for very deep shades just the thing.

Recipe No. 97.

GOLDEN YELLOW ON WORSTED.

25 lbs. Yarn.

Enter well cleared liquor at 160° F. with

1 lb. Sulphuric Acid,

3 lbs. Glaubersalt,

1 lb. Alum,

4 oz. Golden Yellow. { Clayton Aniline Co., Manchester, Eng.
Henry A. Dupee, Boston and New York.

Turn lively, raise temperature, and finish.

Recipe No. 98.

SCARLET ON COTTON YARN.

100 lbs. Yarn.

Put down over night in 20 lbs. Sumac; next morning pass through a bath for 15 to 25 minutes of Oxy-Muriate of Antimony 2° T., wash well and finish in dye bath of

{ Actien Gesellschaft, Berlin.
11 lbs. Ponceau 2 B. { Henry A. Gould,
Boston, New York, and Philada.

Entering at 70° F., and not exceeding 90° F., turning to shade.

To All Whom it May Concern.

The following letter is being circulated by Messrs. Pickhardt & Kuttroff addressed to dealers in dye stuffs:

"Our clients, William Pickhardt and Adolph Kuttroff, the exclusive licensees for the United States, under letters patent, re-issued, No. 9144, dated April 6, 1880; original patent being No. 204799, dated June 11, 1878, are informed that you are infringing upon their rights by selling dye stuff produced from naphthalmine, and known as Fast Red, Roceline, Imperial Red, etc., which is the subject of said patent, without license from them; and, by their instruction, we hereby notify and request you to cease forthwith from such infringement, and render to them, by June 1, 1880, an account of your sales of said patent dye stuff, and to pay to them the damages they have suffered therefrom.

"If you disregard this notice, suit will be brought against you for such infringement.

VAN ZANTWOOD & HAUFF.

NOTES OF THE MONTH.

All communications under this head will meet with due attention, and coloring matters will be fairly tested.

OBITUARY.—M. ZINN, the Russian chemist, to whom is due the conversion of nitro into amido compounds, (aniline being the first substance made in this way) died recently at St. Petersburg.

THE LEEDE MANUFACTURING Co., of 56 Pine Street, New York, write us that they are prepared to sell a mordant equal in all respects to that known as "Bird's Aniline Mordant," (at 2c.) two cents per pound less than the price quoted by F. J. Bird.

WE HAVE received from C. Tiers, Myers & Co., of this city, samples of Casteline No. I XX, and I XXX. It is claimed to be a valuable adjunct in dyeing for softening cotton; no extra labor gives brilliancy to color, and comfort in spinning. We will test soon practically and report. They manufacture also a Castile Wool Scurer, spoken highly of for economy and efficiency.

JOHN B. DETLEFSON, of Bristol, Pa., has a new process for destroying Burrs, Shives, Cotton, and other vegetable matters found in wool, without the least injury to the fibre. The process is used by C. W. & J. Peirce, at Bristol, Pa., and can be examined practically there. The process is not patented, but is a secret, and exclusive rights can be bought from John B. Detlefson.

MESSRS. BASSING, BISSELL & Co., have sent us a sample of their scarlet XX B, "blue shade," for strength and brilliancy of color should surpass anything in the market. 7 ozs. of this blue shade will produce a full color on 100 lbs. wool. Yellow shades can be produced by the addition of Orange. We will produce samples next month, and leave our readers to judge for themselves.

HENRY A. GOULD has sent us samples of Alkali Blues D, and 2 B Z, also a sample of Ponceau III, for Cotton, products of the Actien Gesellschaft, of Berlin.

J. C. BLOOMFIELD & Co. have favored us with samples of French Extract of Madder, and Carmine of Annatto.

WE DYED a handsome sample of cotton with Helvetia Green, sent to us by A. Klipstein, the product of Bindschedler & Bush, Basel. This same green dyes on wool. We will present sample next month.

ALEXANDER BARRILL, New York, has sent us a sample of Ponceau Blue, S. S., which we will test soon, and produce sample. The R. S. is meeting with great favor from manufacturers of fine goods.

HENRY A. GOULD is manufacturing the Standard Black Dyes, formerly manufactured by F. Woodman & Co.; F. Woodman superintending the manufacturing of the same. These dyes are claimed to be perfectly fast to light and alkalis; are dyed in one operation, and have been used on raw cotton with entire satisfaction.

N. SPENCER THOMAS' One Dip Dyes are daily gaining favor among the dyers, as now they understand the full merits of his products, and as we have heard them repeatedly state they would not do without them.

REMOVAL.—Messrs Read, Holliday & Sons, have removed their office from their works in Brooklyn to 22 Platt Street, New York City.

REMOVAL.—A Klipstein has removed his office from 32 Platt Street, to 52 Cedar Street, New York City.

QUERIES AND REPLIES.

Under this head we invite all our friends to make their inquiries on every subject connected with dyeing, etc., and we will endeavor to give them such information in answer as they are in need of. We also invite others to give on the aid of their experience in such replies. All will be welcome.

QUERIES.

71.—I would like to know the origin of fuchsine?

72.—What is hypersonic?—ENGLAND.

ANSWERS.

71.—Fuchsine was the name given at first to the red coloring matter obtained from aniline, by means of bi-chloride of tin; although it was a very beautiful color, "magenta" being superior to it, completely surpassed it in the market, yet it has admirers still.

72.—Hypersonic is a dye wood made of uncertain species of red-wood; Lima wood being one of the principal woods used in its manufacture.

CORRESPONDENCE.

The Mordant Controversy.

Wishing it to be distinctly understood that we have no bias, one way or the other, (both parties in this controversy being friends and patrons of the TEXTILE COLORIST), we copy the following letter from the *Cotton*, of the 19th instant.

A REJOINDER TO MR. F. J. BIRD.

To the Editor of *Cotton*:

In answer to the statements of F. J. Bird, we will agree to sell aniline mordant equal to Bird's that he now is offering, and equal to any other aniline mordant in the market, for 18c. per pound, and for 2c. per pound less than at any time Bird can sell his for. We will send to any party from one to five pounds of our mordant to test for themselves against Bird's, at the price mentioned, and this will be the best and fairest way to expose Bird's imposition and flaming advertisement, which are only like sounding brass and tinkling cymbals. Facts are stubborn realities. Try and be convinced before you buy largely.

Bird's Patent Aniline Mordant is owned and controlled by us exclusively, and we continue to sell it at the usual price.

Any one, by applying at the Patent Office can obtain the formula and ascertain for himself of what it is composed, and this will convince him that it cannot be made at much less than we are selling it.

This is the only real patent aniline mordant in the world. We consider every other spurious imitations, and can meet them all at lower prices than they are selling at. Bird's One Dip Dyes and Anilines we also control, and if Bird infringes on them he will be amenable to litigation. All orders for Bird's Dyes and Bird Patent Aniline Mordant must be sent to us.

We again affirm that we are prepared to sell an article equal to that sold by Bird at 18 cents per pound, at 2 cents less at any time than Bird can sell his.

Yours truly,

LREDS MANUFACTURING CO.,

56 Pine St., New York.

Blue of France.

Responding to inquiries and requests from several quarters regarding the blue colors produced from Prussian blue, we give herewith in detail, the processes the most in use. It will be observed that they are quite similar to each other. The difference is mostly in the skill or in the knowledge of ingredients employed.

Application and Fixation of Blue of France on Tissue.—There are about five methods of forming Prussian blue or Blue of France, which only differ from each other from the use of salt of tin in the latter.

1st. By a salt of sesquioxide of iron, green vitriol or sulphate with yellow cyanide of potassium, named yellow prussiates, in opposition to red prussiate. Thus, from 1822 the process was as follows, on calico:

The tissue is plunged in a solution of iron salt, desiccated and entered in a bath of yellow prussiate acidulated by some sulphuric acid. Such was then the production of blue dye; but to the air the color turned green.

2d. By salt of protoxide of iron, to say reduced to a minimum oxidation. Plunged in a bath containing it in solution, the tissue is afterward desiccated and passed in a bath of yellow cyanide of potassium. Instead of exposing to the air it is then subjected to water containing chlorate of potash or some chloride of lime in solution.

3d. By salt of protoxide of iron and red cyanide of potassium.

4th. By red cyanide of potassium or a sesquioxide of iron in salt, reduced to the state of protoxide of iron by a reducer, such a salt of tin, or a dissolution of sulphurous acid.

5th. By adding to these salts some tartaric acid or bisulphate of potash in equal parts. This process is more expensive. The tissue is dipped in warm water containing tartaric acid or bisulphate of potash, and passed, when dry, in a bath of yellow cyanide, then steamed and dipped in Javelle water for oxidation of the color.

6th. The last is by red cyanide and a reducing agent. The tissue is plunged in a bath containing red cyanide; after desiccation it is subjected to a bath containing chloride of tin with the addition of some acid. A quarter or half hour produces Blue of France. As it can be observed there is nothing difficult in this blue dyeing, any body can plunge a tissue in water containing a salt of iron, then in a bath containing some yellow prussiate, and acidulated with a little sulphuric acid, and finish the operation by dipping it in a water having some salt of tin in solution.

Blue of France on Wool.—In the Gobelin Carpet Works the Blue of France is produced on wool as for silk, by nitrate of iron added to some sulphuric acid. The cloth is entered in the bath, dried, washed, and turned in a bath containing yellow prussiate and a little hydrochloric acid. It goes in the bath with the salt of tin, only at the last of the operation. M. Penet, the director of the dyeing department, has always obtained most beautiful results from that method. And, as everybody knows, this is the model of dyeing works, since all the wools dyed therein, are worked in tapestry, for the palaces of princes, kings, etc. For perfection in the art of ageing colors, this establishment has no rival in Europe. Free confidence can be placed in the recipe we give herewith; it is sanctioned by the experience of M. Chevreul, the best author on the subject.

Blue of France on Cotton, Hemp, and Flax.—Pass the material in water lightly acidulated by sulphuric acid; leave in bath for several hours to open the pores of the fibre. Pass then in hot water 100° containing a salt of iron for about 20 minutes. Nitrate of iron is the most used now. Let the tissue rest for twelve hours. Then pass in

bath of yellow cyanide acidulated by a few drops of sulphuric acid. Let the material rest again and finish the operation by dipping in water containing salt of tin in solution.

RECIPES FOR 100 METRES OF TISSUE.

<i>Mordant Bath:</i> Water 100 litres,	
Persulphate of iron at 48° . . .	12 kilos.
Protochlorure of tin	14 "
Bichloride of tin at 60°	1 "
<i>Dye Bath.</i> —Water	
Yellow Cyanide	150 litres,
Sulphuric acid, 66°	14 kilos.
Sulphuric acid, 66°	1 "

Re-commence operation until reaching the desired shade.

THERE SEEMS TO BE SOME advantage in introducing a little of alum and tartar in the solution when the temperature begins to raise. Experience has proved that these mordants give to the tissue the cast or flower. One-twentieth, if the color proportion is sufficient to feed the bath.

DEFECTS OF WOOD IN ADDITION.—The addition of wood liquor sometimes used in the above is not desirable, because that dye is not staple in blue. It disappears in time. This is not the case with black dyeing, in which logwood enters with advantage. The red cast is always abundant enough in blue shades, even if it diminishes some from the tissue. To perfectly solidify, some dyers give an indigo footing in beginning operation, but, of course this process increases the labor, etc.

FAULTS IN THE TRADE.—The general shortcoming of the dyeing trade is in not washing properly the cloth; hence, harshness in the goods. Mellowness can be obtained only by the removal of acid through repeated washing.

CAN THE SAME BATH BE USED SEVERAL TIMES?—Prussian blue bath cannot be preserved with expectations of using it over many times. It soon gets corrupt, and fails to cover the stuff, therefore the bath should be composed but for present needs, in order to avoid disappointment.

WHERE TO PLACE THE TISSUE AFTER EACH OPERATION.—When the wool, cotton, and silk tissues are mordanted, they are placed in some obscure corner where temperature is not high; the blue gains in strength, because sulphuric acid always reacts something after the dyeing operation. It is hard to indicate all the requisite precautions for success without useless expense.

METHOD FOR CORRECTING FAILURES.—Whenever an operation has failed there are great difficulties in correcting the blue of France. The tissue, being impregnated with acid, does receive easily a new dye, even in doubling the doses. But when desirable to discolor the tissue, it is subjected to a bath made with carbonate of soda, or crystal soda. But the result is always defective; the beauty of the cast is gone.

EFFECT OF SALTS OF TIN.—The salt of tin are employed to produce uniformity in the dyeing; they absorb the salts of iron.

WHAT SALTS TO EMPLOY.—The principal salts of iron in effective use are the nitrate of iron, the chloride, the sulphate, the pyrolignite. This last is the most unobjectionable. But in general, there is no great inconvenience in using either of these salts in place of each other. It is a matter of convenience for supply and cheapness.

IMPROVEMENT OBTAINED IN THE WOOL DYEING.—Some dyers have reckoned an advantage in the employ of red cyanide of potassium, but then they add some little chloride of lime to the bath, and after this process the stuff is always passed in water containing

a solution of tin, the resulting blue shade appearing beautiful. Generally the dose of red cyanide in this bath is of 4 per cent. The use of oxalate of iron on wool and silk, produces a better uniformity. This oxalate of iron is formed in the bath by mixing some oxalic acid with the sulphate of iron.

EFFECT OF AMMONIA.—In order to obtain a brighter cast, the tissue, at the rinsing period, can be passed in water containing some ammonia. The blue dye then is more of a copper cast.—*Teinturier Universel*.

THE *Lyon Press* reports, and comments on, the formation of an English society purporting to counteract the practice of loading silk. The company announces the sale of goods guaranteed pure silk and deprecates at the same time the adulteration generally indulged and tolerated in silk fabrics. Commenting on the subject, M. Marius Moyret declares the task impossible as a practical success. "We have," he says, "fought this discreditable system more than any one. Many writers have followed suit, and floods of ink have been used in protests of all sorts. With what results? None. Why? Because too many producers and consumers, with tyrannical fastness besides, are interested and pleased in the continuance of the evil. All our efforts against it amount to the equivalent history of the notorious usurer, who after having listened attentively to a fine sermon against usury said to his daughter: 'Now, darling let us go to business!'"

Artificial Flower Dyeing.

The manufacture of artificial flowers has lately obtained such an extensive importance in the United States, that the dyeing of the material has been almost raised to the rank of a specialty, as in France. New York and Philadelphia have factories employing thousands of people inside and out, directly and indirectly, in the production of this ornamental article. The consumption of artificial flowers has assumed such enormous figures in America, that Europe would have been utterly unable to meet the demand if the home industry had not so far furnished a good part of the supply. A production of 50 per cent. having been the incentive, the American artificial flower industry is now solidly established.

Of course the dyer has to play a good part in this performance. But so far this part is yet limited to the ordinary material; the finely dyed tissues are imported by manufacturers for want of proper supply at home. This study of the subject is therefore timely as an instructive outline of the industrial conditions required to advance and promote artificial flower dyeing in the country.

Artificial flower-making is almost entirely done by hand. The delicate fingers of woman, and her ready power of imitation, combined with her natural affection for the chaste and beautiful, have enabled her to excel in this manufacture. But for this she must have the fitting material; the proper hues and shades of the tissues as a foundation. This supply constitutes the part of the dyer and of his talent, in imitating the natural colors of the fabrics from which the leaves, the petals, and the buds are cut and made.

The fabrics used for flowers are silk, muslin, cambrics, jaconets, etc. Of course, being purposely manufactured for flower-making, they are of light and delicate texture. Woven from the smallest spun threads, they are impregnated with all the sizing ingredients used in weaving. Unless they are made to special order for florists, they are finished and lusted as usual. In either case, the dyeing must be preceded by the preparatory manipulations of expunging, scouring, washing, dyeing, and mordanting. It is evident that

the sizing and finishing constitute natural coatings, which prevents the coloring matters from penetrating the fabrics. The texture being of a delicate and tiny character, these preliminary manipulations require care, skill, and experience. The removal of the sizing substances from the stuff leaves this with a considerable loss of body,—hence, the necessity of careful handling all through the procedure.

The cotton tissues are the most employed in artificial flower making. They are also the most difficult to manipulate successfully. Being unsized, scoured, washed, and mordanted properly, the dyeing is done as follows:

For a Piece of 20 yards Jaconet, Garnet Colors: Prepare a bath of 40 liters clear water in a perfectly clean vessel, with 2 pounds of St. Martha wood (red wood). Boil half hour; decant clear; when cooled to 50°, enter the tissue, and turn for half hour in that bath. Raise heat to 100°, and add one litre logwood decoction; turn in for 20 minutes, and rinse in a single water.

Purpurine Process.—Light shades are obtained from coloring matter direct; the dark ones must proceed by sumac and iron bath.

Maroon.—Boil for one hour 2 lbs. fustic in 40 litres water with 50 gr. St. Martha wood and 20 gr. logwood. Operate as for garnet, but raise temperature to 125°, pass tissue in for 20 minutes. Rinse in single water. Stretch carefully in open air.

Maroon from Aniline is obtained by the ordinary method of aniline dyeing. The mordant is sumac, applied in proportion to the shade desired. The tissue is well saturated in it, and after squeezing passed through a weak solution of oxy-muriate of tin, washed and rinsed in cold water with a little ammonia to neutralize the excess of acid. The dye bath is raised to 75° F., and the stuff worked in as usual.

The hydro-carbon colors, combined with the vegetable coloring matters, have considerably improved the healthiness of the flower-making people. They suppress in a good proportion the deleterious emanations from the metallic oxides heretofore complained of as being very injurious to florists.

Knab's Indigo Substitute.

This is a deep blue coloring matter, which can be applied without a mordant to vegetable fibres, cotton, linen, jute, etc., and gives fast colors. It is also useful for half-wool and silk, and for printing on linen, cotton and wool.

It is manufactured by the firm of Guthrie and Gotze, of Leipzig, and is sold both as a liquid and as a paste, the latter being sold in two shades—a blue and a reddish. The liquid is for dyeing without any preparation. The paste requires to be diluted with warm, but not boiling water.

Soft water, free from lime, gives the best results. Hard waters must first be neutralized with alum and muriatic acid, as the flot will otherwise curdle on the addition of the dye, and a precipitate will be deposited, which both lessens the yield of the color and injures its brightness. It gives greys, blues, and deep violets.—*Zschraft, Textil Industrie.*

Weighing Silk in the Dye.

In the last issue of the TEXTILE COLORIST we have summarized the deceptive and dangerous practice of excessively loading silk goods through the dyeing process. We have indicated therein the causes of spontaneous combustion, as well as the discredit attached to the adulteration.

Old Europe, suffering more keenly than young America from these industrial frauds, has just opened the fire of a certain reaction

against the evil. A London company has sprung up for the alleged purpose of resisting this debasement of silk fabrics by loading dyes.

The concern publishes and proclaims emphatically that they manufacture silk goods free from any weighting or adulterating stuff. They guarantee this to be a fact, by offering the test of equal volume and weight of their fabrics with undyed silk yarn or silk fibre.

For our part we are perfectly willing to admit the entire fairness of this plan, so far as moral assurance is concerned. But scientifically speaking, there is room for reserve in regard to the absolute safety of the guarantee and test proposed. There is no impossibility in the perversion of this into a deceptive illusion, equally as fraudulent as the condemned practice of loading dyes. This can be accomplished on the alleged pure silk yarn or fibre serving as a criterion by a colorless and heavy mordant. This possible fact of invisible weighting can be appreciated by perusing in some other columns of this paper, the study "On Mineral Mordants." It will be observed that the stannous proto-oxides (salts of tin) possess the subtle properties of loading silk without increasing its volume or changing its apparent condition, since the colorless atomic minerals incorporate its gravity outside of the coloring matter, which is not then necessary. This being the case, what could prevent the reformers in question having the alleged comparison made out of two identically loaded silks—one dyed and one undyed? The only difference would be in the color—made neutral in weight for the purpose.

We do not pretend to impugn the object of the manufacturers reacting against a generally condemned practice. We merely intend to show the difficulty of absolute proof against a refined cunningness in devices equally as perverse as those put up for eradication in England. The ingenuity of trade when based on chemistry can certainly reach this degree of refinement. We have daily examples of more extraordinary feats justifying this suspicion.

New Bleaching Process.

For bleaching all textiles, either animal or vegetable, M. Clement has patented a process which consists in the application of a so-called new salt, a mixture of permanganate of potash, bichrome, and sulphate of soda. Calico is immersed in cold water where some yeast has been added; a fermentation sets in, which is said to remove all the size used for weaving. After twelve hours the pieces are well rinsed and passed through the oxidizing bath containing the new mixture, in the proportion of about 1 lb. in 100 gallons of water; after one hour it is well rinsed and put through a bath containing, for 100 gallons of water, 1 lb. sulphite or hyposulphite of soda, 1 lb. sulphuric acid, 1 lb. soda ash; after two hours it is again well rinsed and passed through hypochlorite of soda, taking, for 100 gallons of water, about 1 lb. hypochlorite and 24 lbs. soda. After eight to ten hours the bleaching of cotton is considered to be complete, only the rinsing having to follow. For linen it is necessary to repeat these operations in the same order till the bleaching is complete, three times being sufficient. Wool is first impregnated with oleic acid, then washed in cold or tepid water, the washing being repeated several times till the water is no more colored. It is next washed in a new bath composed of 100 gallons of water and 14 gallons of mixture, of 66 parts by volume of ammonia, and 33 parts by volume of mineral essence, or any other hydro-carbon, the whole well mixed. Into this bath the wool is brought and well worked, when it will become perfectly clean in a few minutes, and attain a good degree of whiteness. To obtain a perfect white, the same operations are performed as with cotton goods, only the hypochlorite bath is omitted.

Vanadium and Black Aniline.

(Continued from page 104.)

Vanadium is a valuable metal derived from the vanadate of lead found in natural state in Southern America. It is obtained white and, with nitric acid, in blue solution. Its remarkable properties as coloring pigment are not yet thoroughly appreciated on account of its scarcity and high cost. But, besides the important combinations already known in the aniline group, it has proved invaluable as a pigment for china painting and decorative wares. With tanno-gallie acid it makes an indelible black presently studied in other combinations principally with the hydro-carbon colors.

It forms several oxides: Vo , Vo_2 , Vo_3 . The Vo_2 dissolves in acids, forming crystallizable salts of a blue color; the Vo_3 is the vanadic acid producing a yellow color. Alkalies neutralize the acids and yield neutral salts. It combines with other oxides to form green or purple colors. In principles vanadium is similar to chromium. It develops aniline black with rapidity, from a very small dose. M. Witz affirms that one-tenth of a grain of the metal is sufficient to treat one gallon of aniline coloring matter. In its alkaline condition—chloride of vanadium or vanadate of ammonia—the quantity can be increased for more density if necessary.

The salts of vanadium are not yet well adopted by the dyeing trade. Lauth's compounds with sulphur of copper are more generally used. However, several colorists of mark have decidedly declared their preference for the salts of vanadium which they use exclusively for their aniline blacks.

The red prussiate color of cordillot is also maintained in some quarters because it resists better the steam action on the tissue. The aniline black in print seems first almost colorless; but the cloth being suspended, a green olive appears. The fixing composition is then applied and a passage in bichromate of potash completes the fixing operation.

Dyers and printers often have troubles in their aniline black results. The shade does not develop on the tissue, is slack or injured. Hence, the necessity of some convenient and sure compositions calculated to avoid these drawbacks. But, where the dyeing requirements are well understood, and when the aniline salts are pure and sound, there is no special difficulty in obtaining good results through any of the processes in use. Besides defects in the ingredients, the oxidation method had to be found out. The oxidizing action of the air on the fresh dye must be gradual and regulated so as not to be subjected to the sudden changes of temperature at nights or in day time. The suspension of the cloth must take place as fast as the printing is done.

It has also been observed that the fitness of the tissue was due to the differential absorption of the aniline acids or salts, and the chloride proceeds of the pasty aniline compounds. The mode of drying has also been found defective and injurious to the printed cloth. Hotly pressed on one side and left warmly damp on the other side, some corrosive gases were generated with such destructive effects that fermentation, heat and combustion resulted sometimes in piles of the printed goods. The paste is also sometimes the receptacle of mischief. Black aniline must be united with fine, fresh starch paste, consolidated with a tragacanth gum, and made to a proper consistency for a regular and uniform incorporation without fluid parts, nor cloggy portions.

There is yet some uncertainty and obscurity in the chemical theory concerning the aniline black. It is known that the chlorates enter in its printing development better than any other chemical

substances, but the true facts of the combinations are yet undefined. Vanadium and copper do not stay in the black composition after the dyeing or the printing; their action seem to be merely "influential," and the insignificant quantity required for a powerful effect is still a wonder in chemistry. It is an unexplained phenomena like that of the few shots, changing the whole character of a cast iron fusion.

Still there is no black comparable to the aniline black, not even the best indigo black. It suits any sort of manipulation; it is so effective that it absorbs any contrary colors in the process. But it is very tender to the action of the atmosphere. It takes a green cast under the least irregular oxidation. In such a case a soapy and ammoniacal bath restores the color to its proper shade. But the best industrial prevention for such danger is a weak solution of sulphate of iron at 100°F ., in which the dyed cloth is kept half an hour. Other oxidizing agents, such as chromic acid, sulphonoic acid, and chloride of alumina, can protect the aniline black against the greening defects, without impairing its natural qualities.

Azo and Naphthol Dyes.

BY G. AUERBACH.

The azo compounds, though discovered by Mitscherlich as far back as 1834, possessed till recently little technical interest. With the exception of so-called aniline yellow (amido benzol) and prenylen brown (tri-amido azo benzol), no azo compounds were used in the tinctorial arts, or if they had been introduced into trade their nature was not known. Within the last three years the azo-coloring matters have been more closely examined, and thanks to the existence of so many aromatic amines, which all without exception yield diazo compounds, and to the property of the latter to combine with amides, phenoles, etc., forming substituted azo compounds, we have become acquainted with an assortment of dyes of different colors more numerous even than those obtained from the rosaniline group. Most of the azo dyes run from yellow to orange, but reds, violets, and blues occur also, though in smaller numbers.

Among the naphthalene colors, two only, Martius yellow (dinitro naphthol) and Magdala red (the naphthylamine compounds corresponding to saffranine) have reached a certain importance. Naphthalene, however, has served indirectly as phthalic acid for the preparation of eosine, ceruleine, etc. Naphthalene, however, because of greater industrial importance when it phenoles, a δ and β naphthol, were made to react on the different diazo compounds. In this manner, by using the monosulpho acids of the naphthols, there were produced a series of very beautiful orange dyes, the tropoelines. By the action of δ disulphonaphtholic acid upon diazoxytol, there was obtained an exceedingly fine red, which dyes wool as well as cochineal so far as to bear fulling and washing, and threatens to supersede cochineal.

As above mentioned, the number of possible aniline dyes is simply enormous. Aniline and its homologues, the substitute dianilines, the amidic acids of the aromatic series, the amido-phenoles (such as picramic acid) all yield, when treated with nitrous acid, diazo compounds possessing the property of combining with mono, di, and triamines, and with uni or poly-valent phenoles, and forming mono, di, or triamidoazo compounds. According as these azo compounds contain the amide group or hydroxyl groups they are soluble in acids or in alkalies, but it is possible to obtain dyes which contain both the basic and the acid group, and which consequently are soluble both in acids and alkalies. Such a dye is formed by azotizing sulphonaphthylaminic acid, and treating the resultant sulphodiazonaphthalinic acid with aniline.

In practice this class of dyes are of little importance, as the acid or the basic group is neutralized. Altogether, of the numerous azo dyes which have been obtained, and in most cases patented, few have become of commercial importance; a few oranges, and the red introduced by the firm Melster, Lucius & Bruning, of Höchst, are probably the only practically valuable representatives of this class of coloring matters, to which may be joined the saffranines, the indulines, and perhaps also methylene blue.

The oldest known azo dye is, as already mentioned, aniline yellow (amido azo benzol). It is formed when a salt of aniline, *e. g.*, the muriate, is mixed with the nitrite of potash—two molecules of the former to one of the latter—and the yellow flocks of diazo amido benzol, which are separated out, are left for a length of time in contact with an aqueous solution of muriate of aniline. The diazo amido benzol, which is first formed, is converted into the isomeric compound, amido azo benzol. This aniline yellow has not met with very extensive application, since other coloring matters yield finer and brighter shades, and are in addition cheaper.

Phenylene brown (triamido azo benzol) is formed from meta-phenylene diamine, a compound obtained by reducing metadinitro benzol (melting point 187° Fahr. with zinc and muriatic acid. If the phenylene diamine thus obtained is treated with nitrate of potash (two molecules of the former to one of the latter) there is formed triamido azo benzol.

Great hopes were at one time entertained concerning the newly obtained amido azo benzol, but they have not been fulfilled. This compound, which was introduced into the market under the name of ehrysolidine, by the firm Williams, Thomas & Dower, of Brentford, is formed when diazo benzol is brought in contact with methylene diamine. Diamido azo benzol is immediately separated, and is obtained in brown pyramidal crystals resembling magenta. If used alone it dyes yellows to yellowish browns, but has generally been used along with magenta for the production of scarlets.

The mixed azo compounds have attained greater importance than all the amido azo benzois already mentioned, since they combine, with great purity of color, in most cases fastness. The first of the dyes belonging to this class of mixed azo compounds were the tropéolines or oranges. They are obtained by mixing a watery solution of a salt of diazo benzol with *a* or *b* naphthol. In order to make the coloring matter more readily soluble it was converted into the corresponding sulpho acid, or as is preferable, diazo benzol chloride was mixed with *b* sulphonaphtholic acid, obtaining thus at once the sulpho acid of the new compound.

Aniline dissolved in muriatic acid is mixed with the calculated proportion of nitrate of soda, care being taken to prevent a rise of temperature, and the yellow solution of diazo benzol, which is formed, is allowed to flow slowly into a solution of *b* sulphonaphtholic acid, which is constantly kept alkaline. The orange-red solution thus formed is decomposed by the addition of an acid, the precipitate collected, purified by solution in an alkali and reprecipitation with an acid, and dried. In place of aniline, its homologues, the toluidines, xylinides, etc., may be used, and as the molecular weight increases the color seems to turn from yellow towards orange. The substituted anilines, metadinitro aniline, etc., yield dyes which have been patented by a firm in Paris. If the sulpho acids of aniline and of its homologues are employed we obtain likewise fine dyes soluble in water, which are isomeric with those prepared from sulphonaphtholic acid with diazo benzol.

Interesting as all these colors are they have not yet obtained a prominent importance. They are certainly manufactured on a con-

siderable scale, but as orange is a color which can be produced in many ways, both beautiful and cheap, these colors, which are rather expensive, have not been able to fulfil the hopes which were entertained.

The prospect was, however, very much modified when it was found possible to prepare a pure red dye, capable of bearing the stocks, by means of the diazo compounds. The only red dye hitherto available for wool was cochineal (?), which was rather dear, and the shades dyed with it had the bad property of being affected by soda. Hence it has long been the wish of dyers to find a cheaper and more permanent substitute for cochineal, and this wish was realized by Messrs. Melster, Lucius & Bruning, of Höchst. This firm, by treating *b* naphthol with sulphuric acid at a high temperature, succeeded in preparing *b* disulphonaphtholic acids, and at the same time it was observed that the crude result of the reaction contained two isomeric diantho acids, which, when converted into their soda-salts, may easily be separated from each other by treatment with alcohol. The portion of the *b* disulpho naphtholate of soda, which is soluble in alcohol, yields claret shades, whilst the portion insoluble in alcohol yields, on treatment with diazoxyloil, a fine scarlet dye, which is nowhere inferior to scarlet in brilliance and fastness.

Still more recently a color has been patented by Fr. Grassler, of Cannstatt, which will rival the scarlet obtained from *b* disulphonaphtholic acid, and is distinguished by its enormous tinctorial power. It is formed when amido azo benzol is treated with nitrous acid, and the diazo benzol thus formed is brought into reaction with phenols, or their sulpho acids, *e. g.*, *b* sulphonaphtholic acid.

The other colors which have been obtained by the action of diazo compounds, etc., upon phenols, and some of which have been patented, need not here be mentioned, as they possess but little importance, and some of them are not being manufactured.

Of greater importance are three other groups of dyes, which must also rank in the azo series—the indulines, the saffranines, and methylene blue.

A compound belonging to the induline group was first obtained in 1865 by Stadel, by the action of pure aniline upon pure nitro benzol. At that time, however, this color was not yet produced on the large scale, or introduced into commerce. The first chemist who obtained it by the action of aniline upon amido azo benzol were Martius and Griess, though the reaction was more closely studied by A. W. Hofmann and Geyger. They heated amido azo benzol with muriate of aniline and alcohol to 320° F. for four or five hours, and obtained a tough, blue mass, which was first boiled in water, then dissolved in alcohol and precipitated with soda-lye. The free base thus obtained was either converted into a salt or into the sulpho acid, and the color was named by Hofmann and Geyger azo diphenyl blue. The name induline was first met with in the year 1871, and was applied by Knapp, of Stuttgart, to a blue dye which was to serve as a substitute for indigo. Subsequently Caro gave the name "indulines" to all the colors which are formed by the action of imuriated anilines upon amido azo compounds, with the elimination of sal-ammoniac.

Instead of heating amido azo benzol with muriate of aniline in an alcoholic solution to 320° F., these two bodies can be melted together in the dry state, when a melt of a coppery lustre is obtained, which on treatment with sulphuric acid is converted direct into its corresponding sulpho acid. Latterly it has been proposed to obtain blue dyes by heating nitro benzol with aniline, with the addition of double chlorides and a temperature of 320° to 356° Fahr.

The addition of double chlorides is, however, somewhat superfluous, as chloride of zinc alone serves the same purpose, and iron

fillings, as Wichelhaus and Dechend have shown, give good results. If instead of amido azo benzol we employ its homologues, and use other monamines instead of muriate of aniline, we obtain a large series of indulines of the most various shades, from a pure blue to a very red violet. The indulines have acquired considerable importance, and are especially used where it is desired to produce shades resembling indigo, without the fire and the lustre of so-called aniline blue.

In very close connection with the indulines rank the safranines, but whilst the former are produced by the action of amido azo compounds upon muriatic amides, with elimination of sal-ammoniac, the safranines are formed by the reaction of amido azo compounds with amides, attended by the liberation of hydrogen. It must, however, be noted that neither pure aniline nor paratoluidine yields safranine; orthotoluidine must be employed.

The production of safranine is effected either so that orthotoluidine is first treated with nitrous acid, and the amido azotolulol thus obtained is treated with an oxidizing agent, such as chromic acid, or arsenic acid. Or amido azo orthotolulol is first prepared, and is then allowed to react upon the muriate of orthotoluidine.

Safranine dyes very beautiful pure shades, which resemble those of safflower. With the safranines must be classed a very beautiful rose dye, Magdala red, which is formed if naphthylamine is submitted to the same treatment which has just been directed for orthotoluidine.

Magdala red is one of the most valuable but most costly dyes, and till the invention of eosine was the only one which produced fluorescence upon the fibre. In conclusion we may mention a dye whose constitution is not yet exactly known, but which, from its formation, may be considered as a thioazo benzol, corresponding to oxyazo benzol, namely, methylen blue. The first of the colors belonging to this class was prepared in 1876 by Lautz, who oxidized aromatic diamines in presence of sulphur. Thus, phenylenediamine (from nitroacetanilide) yielded a very fine violet color, which can be converted into blue and green dyes by the substitution of aniline, aldehyde, etc.

The only color of this class, however, which has been introduced into practical use is methylen blue. The starting point of its manufacture is dimethylaniline. Like all the aromatic triamines this body, when treated with nitrous acid yields a nitroso compound, which on reduction passes into an amido compound. For this purpose dimethylaniline is treated with enough muriatic acid to dissolve it, and a molecule of nitrite of soda in a dilute solution is then added with refrigeration. The paranitrosodimethylaniline, which is separated out in yellow leaflets, is either directly treated with reducing agents, such as zinc, sulphureted hydrogen, sulphuret of ammonium, etc., or it is filtered off, washed repeatedly in water, and reduced with one of the above-mentioned agents.

If zinc has been used for the reduction at the conclusion of the reaction, sulphureted hydrogen or sulphuret of zinc must be added, the liquid strongly acidified with muriatic acid, and a gentle oxidizing agent, such as the perchloride of iron, must be added.

A blue solution is at once produced, but an excess of the oxidizing agent must be avoided, as otherwise red colors are formed. The blue color is precipitated from the solution by the addition of common salt and chloride of zinc, and purified by redissolving in water, and reprecipitating with the same agents.

This color, which has been patented by the Baulen Aniline and Soda Company, of Ludwigshafen, is distinguished by its splendid greenish tone and its fastness, as against soap and light. It dissolves

easily in water, dyes cotton without a mordant, and can be distinguished from the antine blues by the circumstance that if boiled with an alkali it gives off diethylamine, which may be recognized by its odor.—*Chemiker Zeitung.*

Necessity for an American School of Dyeing.

Indebted as we are to European experience and practical skill for the greatest part of our knowledge in the art of dyeing, we cannot help feeling that there is now to be found in our country a fair amount of ability, which will not fail to grow and increase, with the aid of education. That such progressive aid is wanted none will deny; for, it is a melancholy fact that many, far too many, of our dyers work by guess rather than acquired knowledge. Such a state of things cannot advance the art; on the contrary it must inevitably tend to retard it, and we will continue to be under indebtedness to Europe for all that is new in dyeing. To be sure, we will acquire something by immigration; but skilled men will yet be very few among us; and, moreover, the gain will be a mortifying one to us, in as much as it will not be of American growth. Why then are we not alive to the glaring want of necessary knowledge in this matter? Why is it that all the hints and urgings on the subject have failed, up to this time, to draw the attention of those most intimately interested in it? It is strange that even the natural spirit of national pride would not prompt immediate and liberal action in the formation of classes for instruction in the fundamental principles of textile coloring, and have long since found assurance of success. We are convinced that the effort, once made, will meet with enthusiastic support, and be surely conducive of the very best interests of all concerned, and ultimately give our country an enviable position in a beautiful esthetic art, rendering her desirably independent of foreign teachings.

We give a full extract from the proceedings of the Dyeing Department of the Yorkshire (England) College of Science, in order to show how amply such technical instruction is provided in that country:

"The chairman said that many gentlemen were aware that that handsome building, a section of the Yorkshire College, was built and endowed by the munificence of the Worshipful Company of Clothworkers, London, specially for the benefit of the textile trade of the country. It contained a handsome shed for teaching the designing and weaving of fabrics by instructor Beaumont, with room for a museum and dyehouse on the most approved principles, and was intended to be formally opened on the following day, but the general election having interfered with their arrangements, the opening ceremonial was postponed to a future date. Their special business that evening was to listen to the introductory lecture of their newly-appointed instructor in dyeing, Mr. Hummel. He had much pleasure in presiding on that occasion, as he considered dyeing to be one of the most important branches which their country college had undertaken, and that if we intended to keep our position as a manufacturing nation, our dyers and manufacturers must have a better knowledge of chemistry as applied to dyeing, the cleansing of materials, and the quality of the materials used, and in Mr. Hummel he believed they had the right man in the right place.

He had not only had experience in England, but also on the Continent. He would read some particular extracts from his testimonials, and then call upon him to deliver his lecture. Instructor Hummel stated that his family have been dyers for generations, and that his father studied under Professors Chevreul and Dumas at the Gobelins, in Paris, and was engaged at dyeworks of various kinds in Austria, Italy, Germany, and France. He was also engaged at the celebrated print work of the late Mr. James Thompson, F. R. S., in Lancashire, along with Dr. Lyon Playfair. Mr. Hummel personally studied the chemistry of dyeing at the well-known Polytechnic school of Zurich, under Professor Bolley, where he gained highest diploma in technical chemistry awarded by the institution. Subsequently he studied at the Royal Institution, Manchester, under the late Dr. Grace Calvert, and since 1869 he had been constantly engaged practically in the dyeing and printing of textile fabrics, successively as chemist, sub-manager, and managing partner, in Scotland and England. For some three years, while engaged in Scotland, and after the day's work, he conducted a class for the purpose of imparting a knowledge of chemistry, in its application to dyeing, to a number of young men already engaged in dyeworks, most of whom now hold responsible situations in dyeworks as foremen or managers. (Applause.)

"Mr. Hummel, after sketching the history of dyeing, up to the eighteenth century, said—An ever-increasing number of chemists now began to devote themselves to the subject, some as purely scientific experimentalists, others at the head of dyeing establishments, and, in consequence, from about the end of last century wonderful advances in the art began to be made. Besides the immense improvements in the quality of the dye wares employed and the use of better methods of application, one very important feature now introduced was the discovery by various workers of the pure coloring principles of the several dyeworks and the investigation of their properties. At that time we were almost entirely dependent upon Asia, Africa, and America for our dyeworks, and natural coloring matters alone were at our command. But in 1834 an indication of a coming different state of affairs appeared in the researches of a celebrated German chemist, Runge, who noticed that certain products obtained from coal tar (among others, aniline) were very prone, under certain oxidizing influences, to give purplish colors. This observation of Runge, however, remained for a long time without further result. The first artificial coloring matter obtained from coal tar was a yellow one, namely, picric acid, and its use dates from the year 1849. The manufacture of picric acid from coal tar showed at least that from this dirty, black refuse, useful coloring matter was to be obtained, and, remembering the observations of Runge, the attention of chemists was gradually turned to certain of the coal tar products, more especially aniline. The discovery of the first aniline dye is due to Mr. Perkin, of London, who in 1856 patented the manufacture in a practical form of a beautiful violet color, obtained from aniline, viz.: the mauve. This discovery caused quite an excitement among chemists and others, and a perfect army of chemists has since then been working at the production of artificial coloring matters from coal tar products. As with the earlier discoveries of coloring matters, so it was with the first of

the aniline colors—it was to a certain extent discovered by accident. Mr. Perkin was endeavoring to solve the chemical problem of preparing artificial quinine, when he discovered, instead, the mauve; and Verguin, a French chemist, who introduced magenta in a commercial form, three years later, was merely trying if stannic chloride would form a double salt with aniline chloride, as it does with sal-ammoniac. It is thus to the prosecution of scientific research that we owe the discovery of this rich mine of wealth in dyeing materials. The range, too, of these coloring matters has since been extended by researches conducted mostly from a scientific point of view. The result of the labors in this direction has been, as you know, that we are now able to obtain from coal tar all the colors of the rainbow. Perhaps some may be inclined to say that the aniline colors have been praised too much, that they are brilliant, but fugitive; but I must remind you that science is progressing, and of late years chemists have entered a new field of discovery among the coal tar colors. Not only do some of the recently-discovered colors combine fastness with their brilliancy, but two of them are identical with time-honored coloring matters obtained from plants. The most valuable and permanent of these, the very strongholds of nature, so to say, have been the first to succumb to the vigorous and oft-repeated attacks of the chemist. We were for a long time dependent upon plants and some few animals for our dyes, and it was the general opinion formerly that the vital principle was essential in the formation of vegetable and animal products. This idea, however, was at length shown to be false by the production of artificial urea, and in 1868, in the discovery of artificial alizarine (the coloring principle of madder), we have the first instance of the manufacture of a dyeing material, hitherto only given to us through the agency of plant life. The production of this coloring matter from coal tar is now about 10,000 tons per annum, representing a money value of about a million and a half pounds sterling, while the estimated value of the total production of coal tar colors in 1878 was nearly three and a quarter million pounds sterling. Such is the wonderful growth in this industry since 1856, a fact which surely speaks volumes for the practical value of science. In 1878 indigo was produced artificially, and it seems likely that the veritable coloring matters of logwood and Brazilwood will soon be numbered in the same list, so that in time we may expect to have all our old dyeworks in the form of manufactured products. It would be impossible in a single lecture to describe the numerous methods of applying to the textile fibres even a few of the several coloring matters known to us, but I may, at least, show you that the art of dyeing itself is founded on the laws of chemistry, and that in its practice we have to deal with chemical action. Now, under the term "chemical action," we understand that which occurs when two or more substances so act upon each other as to produce a third substance totally different from the original ones in properties. Where the dyer has to deal with a mixture of coloring matters, and with fabrics composed of different fibres, *e. g.*, wool and cotton, a considerable acquaintance with "mordants" and the affinities between coloring matter and fibre is essential to insure good work, and we surely cannot doubt therefore that a knowledge of that science which treats specially of these affinities will aid the

practical dyer in his work. Another advantage which the dyer may derive from chemical science, is that by its aid he can test the quality of his dyewares, the purity and strength of the numerous ingredients he has to use. (Hear, hear.) Good pure colors and regular work can only be obtained, and with greater economy, too, by employing dyewares of good and regular quality. (Hear, hear.) Unhappily, however, besides this being the scientific age of the world, it is also the age of adulteration, and, in fact, of scientific adulteration. Now this disease is best combated on the homoeopathic principle of "like curing like," and it is fortunately not difficult to detect the most ingenious frauds if only a little science is brought to bear upon them. But the educated dyer knows that science has a far wider application to his art than this. It enables him to appreciate the influence of all those natural agents which play their part during his operations; the water with its lime or other salts, a crowd of mineral agents, acids, alkalis, and salts, a considerable number of vegetable and animal products, the elements of the air, light, heat, and even life itself under the aspect of ferments. In short, a very wide range of those things which are the objects of study in chemistry and physics are constantly employed by the dyer, and it does indeed seem strange if he should not have something more than a mere superficial acquaintance with these bodies and these forces, which pass as it were daily through his fingers. No doubt it is impossible to learn the processes of dyeing by imitation, and even gain in this manner, by long practice, a certain degree of proficiency and success; but this success is only that of a machine. The moment a dyer who has learnt the art in this mechanical way is placed in altered circumstances, where foreign influences intervene, when his receipt no longer gives him the expected result, he stands silent and confused. Every experienced practical man knows that to obtain a given result in dyeing, in different localities or works, even established processes must sometimes be modified; to suit, for instance, the different character of the water, or on account of other more subtle influences. Here it is then that the paths of routine and rule of thumb must be abandoned, and where the one who has most deeply studied the science of his art can adapt himself most readily to the altered circumstances, he will assuredly succeed the best. But when I extol the advantages to be derived from a true appreciation of the immense value of theoretical science, I would in no way have it understood that I disregard the claims of practice, especially in this art of dyeing. Science is necessarily incomplete, and will always be so; were it otherwise, we should be able, by the aid of science alone, to calculate with precision what would result in practice from a given combination of circumstances, and by regulating these gain any desired result; but science is very far from having reached this state of perfection, and hence it is that in all obscure points practice must lend her valuable assistance if success is to be attained. Pure theory is just as liable to lead to error as exclusive practice, hence these two dangerous extremes must be carefully avoided by the dyer. Still there is a perpetual reaction going on between them; each receives a benefit for every benefit it confers, and gains strength in the giving. The proverb says, "Union is strength," and it applies very specially to the subject under consideration where so

many real difficulties have to be overcome, and it is with the object of promoting this union of theory with practice that the Dyeing School inaugurated to-day has been added to the Yorkshire College. The greater proportion of the theory connected with the subject, chemistry, the very alphabet of dyeing, is already taught in the college, and it only remains for me to refer in a few words to the practical side of the matter. Here there is but one true path to follow, and that is the one which, from the time of Ptolemy down to the present, has proved itself to be the only royal road to success, in science as well as in the industrial arts. This path is that of systematic experiment. After studying the nature and properties of some of the principle wares used in dyeing by actually preparing them, our legitimate dyehouse work will consist in making an extended series of comparative dyeing experiments, in which the ingredients employed will be purposely varied both in kind and in amount. Heat, time, and other conditions will also be varied, and all will be expressly studied in relation to the color produced and its permanency of fastness. Each individual influence will be measured by its effect in this respect. As every practical dyer knows, however, the conditions in working on a large and a small scale are somewhat different, and hence no student must for a moment imagine that he can leave the college dyehouse an experienced dyer. The school of experience is the works dyehouse; but I trust he will have learnt here so much of the fundamental principles, so much of the theory and practice of the art, as will enable him to pursue it in after life with profit and success.—*Chemical Review.*

Application of Chemistry to Textile Art and Dyeing.

(Continued from page 111.)

ARSENIC, As = 75.

Arsenic resembles phosphorus in many of its properties, while, on the other hand, it shares some peculiarities with the class of elements called metals, which will be considered further on. It is found to some extent native, but is generally obtained as a by-product of the metallurgical treatment of ores, in which it occurs combined with metals. It is a solid substance with a grayish metallic lustre, which tarnishes in the air. It burns with a bluish flame, giving off vapors that are highly poisonous; when heated to a low red heat, it volatilizes, evolving a colorless vapor, possessing a disagreeable odor of garlic.

COMPOUNDS OF ARSENIC.

Arsenious Trioxide, $As_2 O_3$. (White Arsenic, Arsenious Acid, Fly Poison, etc.). This substance is formed when arsenic is burned in the air, or when ores containing it are roasted. It may be obtained in brilliant crystals, but generally forms a vitreous or opaque, porcelain-like, amorphous mass. It is very little soluble in water, but more so in dilute hydrochloric acid. By the application of heat it may be volatilized; it acts as a terrible poison, whether inhaled as fumes or taken into the stomach. In cases of arsenic poisoning, ferric oxide, freshly prepared, should be administered as promptly as possible; it may be prepared by precipitating ferric chloride or nitrate (chloride or nitrate of iron) by ammonia, and washing the precipitate several times with water.

Arsenious Acid $H_3 As O_3$.—Arsenic trioxide forms with water

arsenious acid, which is tribasic, and forms salts, called arsenites, with many metals and bases.

White arsenic dissolves readily in solution of soda and potash, forming sodium and potassium arsenite, which are soluble; the other arsenites are formed by adding the solution of a salt of the metals to sodium or potassium arsenite; they are nearly all sparingly soluble or entirely insoluble. A solution of white arsenic in glycoline and sodium arsenite (arsenite of soda) are largely used in printing calicoes, delaines, etc., for fixing the aniline colors. Sodium arsenite has also been used as a "dung substitute." Scheele's green (Paris green), so extensively used as a pigment, is a copper arsenite; emerald green also contains copper and arsenious trioxide.

Arsenic Pentasulphide, $As_2 O_5$.—Nitric acid oxidizes arsenic trioxide; the solution is evaporated, and the residue gently heated. It forms a white, vitreous mass, which dissolves in water, forming with the latter: *Arsenic Acid*, $H_3 As O_4$, a strong tribasic acid, the salts of which are well known as arsenates. Sodium arsenate has been used as a "dung substitute." Sodium and potassium arsenates are used largely into the composition of "resists" and "pastes," especially for indigo.

Arsenic Disulphide (Realgar), $As_2 S_2$.—Found native to a limited extent; it is prepared by fusing together 75 parts of arsenic with 32 parts of sulphur, and forms a ruby colored, vitreous mass. It is used together with potash in certain resists.

Arsenic Trisulphide (Opimenes, Keig's yellow), $As_2 S_3$.—This is also found sometimes in nature; it may be prepared by passing sulphuretted hydrogen through a solution of arsenious acid, or by fusing 75 parts of arsenic with 48 parts of sulphur. It has a golden yellow color, is soluble in alkalis and alkaline sulphides; it is used with potash, in resists for indigo, more especially for "pencil blue."

Arseniuretted Hydrogen, $As H_3$.—When in a solution containing arsenic, the conditions for the evolution of hydrogen are supplied (zinc, iron, etc., and acid), arseniuretted hydrogen is given off, which is one of the most terribly poisonous and insidious gases known to the chemist. It gives no warning of its presence, as it is devoid of color, taste and smell, and the dyer should therefore be on his guard and prevent the conditions under which it is formed. Under all circumstances, every solution and every vessel, bottle, etc., containing arsenical compounds and preparations, should be provided with a distinct striking poison label, and they should be assigned a special and not easily accessible place. Since the introduction of arsenic into mills and dyehouses, many deplorable accidents have occurred, owing to mistakes which could not have been made if some simple precautions had been adopted, such as are here suggested.

(To be continued.)

Bleaching and Dyeing.

All vegetable fibres in the nascent state are purely white. Nature produces none otherwise in her chemical laboratory. It is only when the fibre has been separated from its natural custody, and exposed to atmospheric influence, that it loses its immaculate character. The oxidizing power of the air, combined with floating impurities or parasites, causes the blackish coating of fibres in the air or water.

Cotton contains oily fluids; flax and hemp contain silicious and

resinous matters; Jute is impregnated with tannic astringents; manilla, with lime, silica and gum. These mineral and vegetable compounds have an oxalic base which renders them extremely oxidizable under exposure. This oxidation, produced by the oxygen of the air, tends to turn black, and to carbonize all vegetable products, principally fibres. Black dyes are often perfected by the action of these properties in the atmosphere. In its pure condition of cellulose, fibres might be unalterable were it not for the oxides of the air attracted by the surrounding matters above mentioned. There is also considerable soiling impregnated in the fibre by the various industrial manipulations it undergoes in manufactures. The process of bleaching has for object the removal of all these foreign impurities, and the restoration of the fibre in its native state of whiteness and flexibility.

In ancient times this artificial restoration was effected by the agency of the great light distributor—the sun. Its absorbing power on all coloring matters in intenseness was, and is still used as a bleaching apparatus. But this slow and incumbering process requires vast spaces, considerable attention and facilities which city factories cannot economically possess. Chemistry has discovered agents and methods far more accessible and economical. The chlorine gas of Scheele having proved its destructive power on vegetable colors, Berthollet found it industrially applicable by the combination of oxygen with spirit of salt or muriatic acid, now called Chlorohydric acid. Its first applications in the nascent state generated by evolving chlorine gas through fibrous materials, though effective, were not without grave inconveniences and expensive arrangements. This dry system was superseded by the solution methods now in use. Subsequent discoveries permitted to solidify the chlorine gas into a molecular body carrying it. Lime was found a congenial vehicle for the discoloring gas, and from that time chloride of lime is the principal bleaching ingredient in use. English manufacturers were the first to appreciate the importance of the discovery, while continental routine stubbornly stuck to the old solar method. Watt came to witness some experiments of Berthollet, and returned promptly to introduce the discovery in Scotland, where it flourished instantly and developed its valuable importance all over England,—hence, all over the world. The intimate chemical action of this bleaching agent is not yet very well understood nor defined. The discoloration is called oxidation. We rather would call it deoxidation, since it removes by absorption or expulsion the coloring oxides from the fibre. But this difference of words matters little in the fact.

The production of chlorine and hypochlorite at a cheap cost from the by-products of artificial soda manufacture based on common salt, was the crowning feat of chemical achievement. Were it not for the extreme cheapness of the ingredient, its success would still be limited. But though the principle of chloride of lime as a cheap bleaching agent is a fact, the practical application of the ingredient is not yet generally perfect. Crude and rudely used, it produces often great mischiefs, and causes deterioration of goods. These inconveniences prevent, more than thought of, this country from elevating her vegetable textile products to the high standard it could otherwise reach. Harshness, bad tinge, deterioration, difficulty of dyeing and printing, subsequent changes, and decay from a latent destruction originating in the bleach are defects which discredit frequently goods treated with this chemical. A next article will be devoted to the study of this important part of the textile industry with the view of indicating some valuable improvements in the various manipulations of bleaching and sizing.

Artificial Indigo.

The invention of the time-honored vegetable indigo, seems to be the objective point of current chemistry. The tinctorial trade being tributary to foreign countries,—East India and Central America. For this expensive coloring matter, many chemical investigators have been encouraged in the search of substitutes for the imported article. The hydro-carbon field, from which so many valuable discoveries in the color line have originated, has been explored in view of finding an artificial indigo and from all appearance, with a certain amount of success.

M. A. Baeeyer, of Munich, claims that he can produce artificial indigo by the action of an alkali, and of a deoxidizing agent, such as glucose, upon a nitro-phenil base.

Now, M. Auerbach claims a similar result from a combination with alizarine,—that new substance which dethroned the madder plant. The mineral element turns to be a terrible adversary for the vegetable kingdom. This fact lead to the logical supposition that what is called the mineral element is but a condensed form of a pre-existing vegetable series passed into an oxidized or carbonized state.

The new alizarine blue of M. Auerbach is produced by the following process: One part of dry mononitro-alizarine is mixed with five parts of sulphuric acid and half part of glycerine (density 1,262) and heated moderately. The reaction begins at 107° and becomes violent at 200°. An agitated boiling is produced and sulphurous acid with *aerolein* is evolved. When the boiling has ceased the whole mass is plunged into water; then re-boiled and filtered. The residuum is boiled again, three or four times with diluted sulphuric acid. The filtered liquors are then mixed and allowed to cool. The blue matter agglomerates in the form of brown crystals. These crystals are purified in mixing them with water and a solution of borax until the liquid turns a brownish violet. The blue formed with boric acid, an insoluble compound. This precipitate is washed and decomposed by an acid, and the blue is obtained pure, in the shape of a violet silky paste. To have the product perfectly pure, it must be crystallized successively from its solutions in its various solvents, heavy naphtha, amylie, alcohol, and acetic acid (crystallized). In its pure state this blue presents in the form of brown, bright needles, fusible at about 270°. It has been reduced into the condition of salts. But the analysis of these has not been satisfactory because of the difficulty of obtaining products absolutely pure. However, the constituent of the blue draws near to the blue of the aldehydes discovered by Ladenburg, and which are formed when the aromatic orthodianides, acting on the aldehydes.

VALUABLE NOTES.

BLUE DYE ON MOHAIR; FOR 40 POUNDS.—Water for full bath. 4 pounds prussiate of potash in solution. Enter cold; raise slowly in 2 hours, to 75 or 80°. Remove, air, and add to bath, 4 pounds tartaric acid, 1 pound tin salts, 34 pounds sulpho-muriatic acid. Re-enter and turn until boiling. Boil up to discharge some of the blue. Expose to air, and wash after two hours exposure.

The sulpho-muriatic acid is prepared in pouring gradually 5 parts sulphuric acid into 4 parts of chlorhydric acid, in a glass vessel with a stopper.

SIZING FOR PANAMA HATS.—2 litres of alcohol, 95°; 1 kilo, sandarach; 200 gr. turpentine. Dissolve the whole and let digest for 10 days. The sizing is applied two coatings inside and two coatings outside. Methylene may be substituted for alcohol.

VELVET DYING.—Several tests of dyeing velvet by the cachou de laval, made at Quiricos, have resulted satisfactorily in favor of this new cachou, viz: 55 pounds velvet, in vat, 70 litres water; cachou de laval, 16 pounds; common salt, 2 pounds; coloring matter, brown bismark, put in two parts. Ten minutes boiling; dyeing done in the same time.

The same bath was used again with the addition of 5 pails of water: of 2 pounds sulphate of copper; of 1 pound sulphuric acid—color obtained: reddish gray by same manipulating. Four parts of boiling water, and 3 of coloring matter with 2 litres muriatic acid made another bath. Three pieces of velvet were thus very well dyed in various colors from the first lot of 16 pounds cachou de laval.

—*Mon. de la Teinture.*

CAUSES OF MYSTERIOUS DEFECTS IN DYING.—Frequently dyers meet with mischievous and unaccountable defects in well dyed cloth exposed in open air. These accidents are generally caused by chemical agents floating in the atmosphere and generated by some surrounding action. For instance, a stable will produce ammonia, a gas establishment will evolve sulphurous acids, a foundry will generate oxides, fresh mortar may yield lime in the air, water-closets may impregnate the atmosphere with sulphurets and carbonic acid, and any industrial works around may send acidiated steam on the dyed tissues. The aniline colors are generally more susceptible than any other to be influenced by these various chemical saturations of the air.

M. SCHUTZENBERGER publishes, in the 2 vol. of general chemistry, a full study of the new bodies called *azoxanmonia* or *hydroxizamine*, which is produced from combinations of azote, oxygen and the kaloides bodies; also a review of the stannous gray of the cyanogen and derivals used in the dyeing arts.

M. BOULADE is out with an instructive pamphlet on aerometers, deusimeters, volumeters, etc. The instruments of Beaume, Cartier—Gray—Lussac, Richter Sykes, Twaddles, etc., are reviewed as to their relative merits.

We remark in this essay the following novelties. The ponderimeter (for alcohol); the liqumeter of Musculus D. Watson; the oenoharometer of Houdart; the glycometer, and the lactodensimeter (milk tester).

FELT HAT DYING; Black.—Six dozen felt hats—about 40 pounds—after filling. Pass in water at 75°, rinse and boil in mordant 1 hour, viz: cream tartar, 1 kilo; bicarbonate potash, 250 gr.; sulphate of copper, 100 gr. Cool and dry, then dye in: logwood, 12 kilos; yellow wood, 1 kilo; sulphuric acid, 100 gr. Boil 1 hour; rinse and dry. Finish and size with tragacanth gum.

Gray.—Wash well and boil 1 hour in a bath of: logwood, 1 kilo; sumac, 1 kilo; cream tartar, 1 kilo. Raise, and add to bath 250 gr. sulphate of iron. Re-enter 1 hour at 75°. Rinse and finish as above.

Grayblack.—Same process with 100 gr. sandac wood; 200 gr. nutgall; 1 kilo. cream tartar. Raise and add 250 gr. sulphate of iron as above.

GOLD, SILVER AND BRONZE PRINTING.—M. A. Wohlforth has recently patented a process for conveying gold, silver and bronze in

the print of tissue, oil-cloth, paper, wood, etc. The process consists in mixing the metallic powder with silicate of potash or oxide of sodium. Two parts of the syrup thoroughly amalgamated with one of the pulverized metals produce a proper substance for printing on a fast and stable base. Water, light, heat, oxygen and hydrogen sulphurets have no influence over this print. Whenever the metallic and silicate compound is found to hard or stiff on the fabrics, an addition of glycerine in the paste makes it soft and pliable. The trimming of the print and the clearing of the form can be done with warm water.

THE FLEECE DYEING can be done economically by the following methods: *Violet Fast*.—Bath of indigo according to shade. Mordant of cream tartar and alum. Madder extract in proportions.

Orange.—Madder, querciton, cochineal, lac dye, yellow wood.

Blue.—Indigo exclusively.

Plain Black on Calico.—Mordants: 100 litres pyrolignite alum 4°; 100 litres pyrolignite of iron 6°. Saturate the stuff in fulling. Let the mordant wet on for 12 hours. Air it, mud pass to the silicate of soda at 50°. Wash and dry hot with decoction of logwood, 4 kilos., for 100 metres, of 1 yard wide.

Size for the same.—Weak solution of logwood in 100 litres water; 1 pound grease, 12 pounds potato starch. 8 pounds white starch; 2 litres sulphat of iron in solution (30 per cent. in water). Let settle, draw clean, cook and use it warm. Dry inside and expose to air 24 hours.

SIZING FOR SILK FOULARD.—30 litres water; 200 gr. potato starch. Cook and add: 15 gr. oxalic acid in powder; 1 kilo. glue (gelatine skin). Pass through sieve. This makes a soft-touch size. Apply on copper roller heated by steam, if the dye is steam colors. —*Mon. de la Teinture*.

BLEACHING OF SPONGES.—Wash in tepid water, and after in water acidulated with muriatic acid. This removes the calcareous lime of the pores. Then plunge in a bath made of 5 per cent. chloridic acid on 100 parts water and 6 parts of hyposulphite of soda. This process takes 24 hours bathing, and is superior to the sulphurous acid method. —*Mon. de la Teinture*.

ALKALI GREEN is the new color claiming superiority over all the other greens known. It is produced by Meister, Luchs & Bruning.

NEW BLACK.—A new black dye for goods of cotton and wool mixed—cotton warp and wool weft—is out in France with the claim of perfect shade, solid color, promptness and cheapness—1 cent per metre. The sample before us is really creditable on the above data. —*Moniteur de la Teinture*.

GOLDEN MAROON FOR FELT HATS; 24 HATS (felt).—Water, 40 gallons; for mordant bath viz: chromate potash, 60 gr.; blue vitriol, 20 gr.; sulphate iron (neutralized), 30 gr. (Neutralized is l. where alkali has counteracted sulphuric acid). Each substance is dissolved separately and poured in the boiling bath. Hats in 30 minutes; washed in cold water and re-entered 30 minutes again. Then removed and brush separately all over in cold water until perfectly clean. Dye bath. Add sharp water with 34 pounds fustet powder, 34 pounds catechu, 100 gr. logwood extract, 50 pounds curcuma, 50 santele wood. Boil sharp 1 hour; pass bath to sieve; add 100 gr. alum. Re-enter three times 30 minutes each, plunging in cold water between each time. This operation must be conducted carefully and cleanly all over. Avoid contact with any moisture of the mordant bath.

Same shade in English gold reflect is obtained by suppressing curcuma and reducing fustic of 1, and in increasing sandile of 50 gr.

Deep Maroon, simple styles, by same process in adding 100 gr. logwood extract.

The Hasana shade, by reducing all to one-half; *the nuts shade* by reducing to one-quarter. Never mordant in advance. —*Moniteur de la Chapellerie*.

Patents Connected with the Tinctorial and Finishing Industry.

Wool-washing Machine.—Josiah K. Proctor and J. Henry Knowles, Philadelphia, Pa. Filed July 21st, 1879, granted April 7th, 1880. We will illustrate this machine in July number with claims.

Manufacture of Anthracene.—Fritz Salathé Baale, Switzerland. Assignor to John J. Keller (Trustee), New York. Filed December 6th, 1879, granted May 11th, 1880.

Claim 1.—In the art of manufacturing anthracene and homologous hydro-carbons, the improvement consisting substantially in the treatment of petroleum or its derivatives in the presence of charcoal at a dull-red heat, and the condensation of the tarry matter produced by such treatment, substantially as before set forth.

Claim 2.—As a new article of manufacture, anthroctic tar, hereinafter described, which is distinguishable from coal-tar by its freedom from acid matter.

Manufacture of Artificial Indigo.—Adolph Baeyer, Munich, Germany. Filed April 6th, 1880, granted May 11th, 1880.

Claim 1.—As a new manufacture, the dye-stuff or coloring matter designated "Artificial Indigo," produced substantially as above described, by the action of an alkali and a deoxidizing agent upon ortho-nitrophenylpropionic acid, or by any other means which will produce a like result.

Claim 2.—The within-described process for the production of artificial indigo by the action of an alkali and a deoxidizing agent, such as glucose, upon ortho-nitrophenylpropionic acid, substantially as set forth.

Water-proof Fabric.—Peter Peterson, Philadelphia, Pa. Filed Jan. 21st, 1880; granted May 11th, 1880.

BRIEF.—The proportions for 500 square yards of material are as follows: Primary composition, scalded rye flour, seventeen pounds; burnt alum, one-half pound; water six gallons. Heat to the boiling point and apply the primary composition with a brush, and then dry the material. Next prepare the secondary composition: linseed oil, twenty-four gallons; litharge, three pounds; American ochre or other earth paint, forty-five and one-half pounds; melted rosin soap, one and one-half pound. Thoroughly mix and apply with a brush.

Claim 1.—New article of manufacture, consisting of canvas or other textile fabric having a primary coating or layer of a sizing composition consisting of scalded rye flour and burnt alum dissolved in water, and a secondary coating or layer of litharge oil, litharge, earth-paint, and rosin soap, as described.

WANTS.

Manufacturers desiring help in any department, or persons seeking employment, can have their wants advertised in this column for the low rate of 25 cents per line. No other advertisements will be admissible in this department.

WANTED.—An experienced dyer for Zepphr Yarns, competent to match anything shown on Bergman's Zepphr Card. Address with reference, Practical, Office of TEXTILE COLORIST, 256 Arch Street, Philadelphia, Pa.

WANTED.—A first-class dyer on Piece Goods, Cotton and Woollen Yarns; thoroughly posted with the Indigo Vat and Fancy Colors. Reference required. Address, Piece Dyeing, Office of TEXTILE COLORIST, 256 Arch Street, Philadelphia, Pa.

TEXTILE COLORIST.

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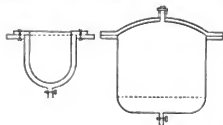
No. 19.

On Calico Printing.

BY DR. M. HASENCLEVER.

(Continued from page 122.)

Schunk and Pincoff took out a patent for a preparation of madder which they called Pincoffine. It is garancine prepared by the usual method, which undergoes, after the pressing, a process of heating. The moisture which is contained in the pressed garancine turns into steam, and the temperature is forced up until it reaches 300° F. The apparatus which is used for this purpose can be of different structure. They can consist of a strong kettle which is heated by open fire, or the garancine may be put in a vessel with double coat; the heat is produced by introducing steam between the two coats, or it can be done in a kettle with false bottom; the steam is allowed to pass through the false bottom, and after some



time the outlet valve is closed. After the steam has reached its desired force, it is shut off. The usual time for steaming is 14 hours; for some specially fine products longer steaming is required. This preparation has found a very good market for some time in England and Scotland, on account of its brilliant lilac shade.

Madder Flower (*fleur de garance*).—This product has also been very largely manufactured; it was first patented in France by Julian and Roguer. The madder powder is mixed with acidulated water in order to neutralize the lime, and left standing for from one to six days. The time of process depends on the state of fermentation which is required for the desired product. The liquor is then drawn off and the residue pressed and dried. Fermentation can either take place by itself, or, as it was sometimes done, by the addition of some yeast.

Colors obtained from Madder and its Derivatives.—There is a great variety in shades and colors which we can obtain from the madder and its preparations. Nearly all shades, from the darkest brown-black to pink, can be made. It depends on the nature and the quantity of the mordant used.

The madder colors have been for a very long time looked at as a specialty. It depends very much on the quantities of the various ingredients used, but more on the practical experience and skill of the colorist. Whilst it is very easy to produce second-class madder colors, it is very difficult to obtain good and bright ones, and establishments which have the reputation of producing first-class goods, are very anxious to preserve the secret of the different manipulations. Some firms have kept up their reputation to produce a first-

class article for almost a century, whilst others have tried for many years to come up to their point of perfectness, without any marked success.

It may be possible that the water to be used is of considerable importance, but it is certainly not in that degree, as manufacturers sometimes believe. It may be a fact, that soft water is better for dyeing purposes than hard water, but many factories have tried for years even by using water of all grades, but without the desired result, and it cannot therefore be denied, that there must be some secrets in the manner of producing these colors, which the interested parties are not very willing to make known to everybody.

Before the goods are received in the dye bath, they have to undergo several processes. The mordant is first printed on, and then the cloth treated in various ways before it is ready for being dyed.

The white cloth, as it comes from the bleaching department, where it has been freed from all oily substances and made suitable for printing (as described before), is delivered into the printing room, where the mordant is already fixed, and ready to be printed on. The mordants are to be selected according to the shade and style required, and it is therefore the very first important process.

As said before, madder and its preparations are able to produce a great variety of shades of which only the most important ones may here be mentioned.

Madder Purple.—This is one of the fastest colors known. It is able to be washed many times without the least change in the color, and even the light has less effect on it than on almost any other color. It certainly must be understood, that in order to obtain such a fast color, all the processes have to be looked after with the greatest care and attention.

The mordant employed for this color is iron liquor, which is suitably thickened and brought into the printing machine. The roller which is engraved to be used only for this single color, produces it on the cloth, after which it is taken to further treatment. Since the first invention of the process there have been many changes made, but the original idea has been more or less the same.

Some madder dye works have used a bath of chlorate of potash through which the cloth passes before the mordant is put on. They claim better results as to brightness and fastness.

The thickening can be done either by flour, artificial gum, etc., and as to the iron liquor which is used, the quantity of it depends on the deepness of the required shade as well as on the quality of the thickening.

In order to give the printer a chance to watch the pattern in the machine if several colors should be required, it is customary to have the mordant slightly tinted, either by a very weak solution of aniline red, or any other color. It should be of course so selected that it will in no way interfere with the shade, which is wanted after the whole process is finished.

After printing, the goods are brought into the ageing hall. This is the same department which is used for print goods, the time however, as well as the degree of humidity, being different from that which is used for common prints. The theory is about the same. The pieces are suspended on rails at the ceiling and left there hanging for several days; the position of the cloth has to be changed once or twice during that time, as the moisture is not in every part of the hall the same.

The moisture is produced by steam, which passes through the floor of the hall at several places. A double thermometer, which is placed in one or two places of the hall, indicates the degree of moisture which is suspended in the air, and by regulating the steam, which passes in the hall, every degree of humidity can be obtained. The cloth now passes through the ageing machine, which is similarly arranged to the ammonia box used for aniline black; it is only larger and higher. The temperature and the quantity of moisture in this machine must also be arranged according to the style of work which it is used for. This ageing process changes the soluble mordants into the insoluble state; acetic acid gets free, and the metallic salt is retained on the cloth as an oxide.

When the pieces have passed this machine, they are put up in bundles, and after laying for 12 to 24 hours they are taken away for further treatment. The next is the dunging and fixing. Dunging received its name from the material which was formerly used for this purpose. At first, cow dung was generally used, but owing to the disagreeable work and transporting of this matter it was tried to replace it. There have been many experiments made before they succeeded in this matter, but at last it was found that arseniate of soda and silicate of soda are good substitutes. The dunging apparatus is very similar to the washing machine used in the bleaching department.

The dunging is generally done twice. The first treatment effects to clean away the unfixed oxides in the thickening and a part of the thickening itself, but as it cannot be done perfectly the first time, a second treatment is necessary to complete the process. The temperature of the bath is generally fixed to 170° F., but it has to be changed according to the colors and styles which shall be produced, but it is not advisable in any case to use more heat than 170° F., as practice has shown that the mordants in this case gets changed and do not give good results.

By this dunging process, the thickening, together with the unfixed mordants, are taken from the cloth, and although it is not very well possible to effect a chemically pure cleansing, the cloth is clean enough to pass in the dye bath safely.

(To be continued.)

Wool-Washing Machine.

JOSIAH K. PROCTOR AND J. HENRY KNOWLES, PHILA., APRIL, 1880.

In our last issue we promised to present this month the illustration of the above machine, together with the claim, a promise which we here perform:

CLAIM, 1. The combination of the bowl of a wool-washing machine with rake *I*, provided with a series of straight prongs, and a

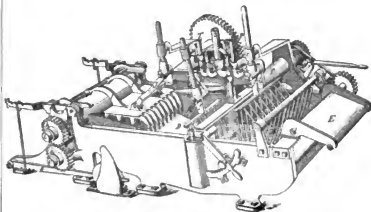
series of prongs, *e*, curved outwardly and upwardly from the said straight prongs.

2. The combination of the bowl and the rake, *I*, having straight and curved prongs, with the pivoted fork, *N*, having a restricted movement, and situated in respect to the rake as set forth, so that both curved and straight prongs of said rake shall, during the movement of the latter, pass between the teeth of the pivoted fork.

3. The combination of the bowl, its perforated bottom, and the rakes *I*, *I*, with the air chamber, *P*, situated midway, or thereabout, between the said rakes.

4. The combination of one or more rakes, *T*, of a wool-washing machine, the apron *E*, and first rake, *I*, with gearing and clutch mechanism, substantially as described, whereby the movement of the apron and first rake may be discontinued while the other rakes are in operation.

5. The combination in a wool-washing machine, of the upper and lower pressure rollers, the trough, *T*, the inclined plane or



chute, *D*, the perforated or slotted chamber, *T*, and the water-pipe, *g*, communicating therewith.

6. The combination of the lower-pressure of a wool-washing machine and its shaft and bearings with collars, *y*, on the shaft and the guards, *u*.

Suggestions on Feather Dyeing.

(Continued from page 135.)

There is another process for obtaining light garnet. It is based on fuchsine, acid and roccelline. This last coloring matter is derived from extracts of the orchilla or lichen tribe, forming the cudbear coloring matter. The process consists in starting the feather in a fuchsine bath with acid, and in topping it with the roccelline yellow. This must never be used first; it would be refractory to the acidulated fuchsine. No indigo carmine can be used in this combination, since roccelline acts as a resist, and can only be used as a covering shade.

Hard feathers can be treated by the two above processes, but the heat must be increased until penetration takes place. Ostrich feathers are also dyed by the same method, with the only difference that the tender ends must be treated with discrimination, and differential degrees and time, in order to have an average shade brought up to evenness.

Birds, wings and skins cannot be well dyed in orchilla on account of the contraction of the epidermic tissue by the heat. The acidulated fuchsin and roccelline suits better. The only difference is to test the sample shade with uniformity, but a campeachy bath afterwards may rectify the first dye.

The deep garnet, called Bordeaux shade on account of its resemblance to Bordeaux wine color, is obtained from orchilla or from the extracts called roccelline, purpuraline, etc., all derived from the same base. Cardinal is a bright sharp garnet obtained easily on feathers by roccelline, which is very adaptable to vivid shades. The only inconvenience with this coloring matter is that it does not associate well with other colors on itself as a base, except with orchilla. It must generally be used alone, if not, mordanted. Orchilla is an exception, but then, when used in connection with it, roccelline may assume an intensity which resolves into a bronze shade on certain parts of the feathers. The surest method is to use it alone in combination with acids, such as acetic, oxalic, sulphuric, acting as a mordant and fixer.

The feathers are first entered in the simple bath without acid for a few minutes. Then the acid is added gradually and in moderate doses, otherwise the coloring matter might precipitate and coagulate as a lac, and become inert as a coloring diffuser. This loss is avoided by a careful dilution of the acid and of the coloring matter, which must predominate in the bath. These dyes must be heated at 75°; low temperature gives dull shades.

Birds, wings, skins, etc., require 10 to 12 hours of bath at that temperature. Some coloring matter is added when absorption requires a re-enforcement of density. Rinsing is done several times in fresh water.

When roccelline is employed with acetic acid it associates with eosine and erythrosine, from which various desirable combinations can be obtained. Violet cast is then given by acidulated fuchsin, or yellow shades by curcuma. Aniline blue can be used as a shade if desired.

Ponceau is another line of shades in general use on feathers. They are direct or compounded.

The old process based on cochineal is one of the best as far as the color is concerned. But it has the grave drawback of a long and difficult shading, which require a skillful and experienced dyer. The slowness of the procedure also bears the inconvenience of risking the feathers to damage during the operation. The gelatinous matter of the feathers is apt to deteriorate by long manipulation of the dyeing character; the process must be short and effective.

The new coloring matters are in this respect preferable; their efficacy is such that any ordinary dyer can handle them successfully. The ponceau scale is represented by the various dyes recently discovered, and entered in the trade under a variety of names, such as the *luteine*, *mandarine*, *capucine*, etc., which make the compounded ponceau, while the azo products naphthaline make the direct colors of the ponceau scale, as will be seen subsequently.

Light colors are of course more difficult to apply successfully; they require more scientific practice, or its equivalent in actual experience. The light ponceau cochineal has for a long period been in favor. It is obtained from a preparation called "tin composition," constituted as follows:

5 lbs. Tin, dissolved in
35 lbs. Azotic Acid,
2 lbs. Salt,
15 litres Rain Water.

This stannous acid is the mordant added to the bath at the de-

gree desired. The feathers are mordanted first, and the cochineal is added in, heating moderately. Then the feathers are re-entered for the time required, according to shade and quality.

Another stannous composition is made in mixing the following:

15 lbs. Oxalic Acid,
8 lbs. Salt of Tin,
6 lbs. Bichromate of Tin,

Rain Water in sufficient quantity for dilution.

It is used for mordanting, as above. Very brilliant scarlet and pink are thus obtained.

From this color the salmon shade can be derived, as well as very light ponceau. The salmon and this clear ponceau are nothing but pinks modified by a little of eosine or a trace of orange, mandarine, etc. It is a simple matter of shading by yellows and reds, in which curcuma, roccelline, etc., may also enter, as explained in a previous article, showing that fine oranges can be obtained from curcuma and orchilla, or picric acid, roccelline, etc. The present fashion tending towards these lively shades, these remarks may be useful here.

The reddish yellows are also in the mode of the day. There is a variety of these colors; they are principally derived from green and red shades. The yellow greenish casts are generally obtained from picric acid alone, or mixed with curcuma.

The reddish casts are produced by curcuma mixed with orchilla or roccelline. The solid yellow from a combination of roccellins and orange is easily produced, but without much brightness. The gold yellow, or Martins yellow, is a coloring matter giving fine shades to feathers.

It only has the grave inconvenience of discharging on any contact after dyeing. It is also very forward in the dye, and cannot be brought back to lighter shades whenever it has gone too deep. This drawback has caused preference for the compounded yellows from mixed colors, as above stated.

The easiest way to obtain the scale of yellow shades is in the mixing of picric acid and curcuma, but there is in them an instability to light, which has to be overcome. These yellows from curcuma are sometimes so volatile, that a few hours of exposure in the sun light will tarnish the shade to a certain extent. Picric acid is somewhat more stable, but its colors always tend to a change; from yellow-green it turns yellow-red and dull, under the prolonged action of light. Experience has proved that compounded yellows on feathers are always more permanent than the direct single color.

In order to make the yellows more resisting, it is urgent to mix in it a solid coloring matter of the same shade. The one called *orange II* is a reddish yellow resisting to light. Some of it mixed with curcuma gives to the dye a good degree of resisting power.

A special test on this important point has given the following result:

Feathers dyed yellow in curcuma single have been discolored after 24 hours exposure to the rays of the sun. Feathers of same sort dyed in the bath with the addition of some *orange II* have remained unaltered after several days of exposure to an equivalent sun light. If picric acid is added to the above mixture of curcuma and *orange II*, the permanency of the shade is complete.

This important result is equally obtained for lighter shades, such as cream, straw, ivory, etc.

This process is applicable of course, on darker shades derived from the respective coloring matters, and on any sort or kind of feathers. The procedure can be simply summarized, as follows:

The bath is acidulated by sorrel salts or sulphuric acid. The curcuma is first introduced in the boiling bath, and the shades are

brought out by the two other substances. The function of picric acid consists in greening the shade; that of orange, in reddening it. This last substance must be handled with care; as it is resisting to soap, it cannot be reduced easily whenever there is an excess of it in the dye. When the color happens to be too deep in ground, the feathers must be washed in soap, passed in carbonated water, and rinsed in pure water. Then, re-entered in a new bath with picric acid to correct the excess of red in shade.

The plain solid yellow must be produced through the same association with curcuma and picric acid, which give brightness, as well as resistance, to all yellows compatible with the combination.

The gold yellow, or Martin's yellow, can be indifferently applied on all sorts of feathers. It requires no acid, and a comparatively low temperature—from 100° to 150°. This coloring matter is not very soluble in cold water; it must be dissolved first in hot water, in order to reduce all the grains, which otherwise might stain the shade. In case it turns out excessively dark, the coloring matter can be lowered by a bath acidulated with sulphuric acid. Martin's yellow, before mentioned, is not easily handled successfully to reach a given sample of shade. It is difficult to manage and regulate its action. On account of this inconvenience it is only used for special cases.

The color given by picric acid is a frequently desirable linden shade. This greenish-yellow has been, and is still, in favor when neatly done. As it is an easy and cheap process, feather dyers have a preference for it.

Picric acid mordants equally hard and tender feathers. The bath acidulated with sorrel salt and kept at 90° to 100°. The acid, being well dissolved and filtered, is added slowly, and by small portions, in a very diluted state, while the feathers are constantly agitated in the bath. The coloring power of picric acid is very strong. This is the reason why it must be poured in by small doses, in order to avoid over-reaching the shade of the sample. Whenever this happens, the feathers must be subjected to an oxalic acid dilution. The inconvenience to avoid in this case is the difference of shade between the quill and the feather. Rapidity in the operation of dyeing generally avoids this defect, because of the heat softening the tube.

Ostrich feathers can be dyed in linden shades in a starch water acidulated by oxalic salt. The green shades are obtained by adding a trace of carmine indigo dissolved in hot water.

Maize, straw, wheat, ivory, and cream colors are obtained by combinations of proper proportions in curcuma, orange, and picric acid, as above remarked. These light shades require considerable care and attention bearing on the respective coloring matters which have their peculiar properties and inconveniences in some respects. Thus, the orange must be dissolved and filtered a few days previous, to avoid granulation, which generally stain the feathers. The doses must be small, and be cautiously added, according to the shade desired. The picric acid will have to be used with special attention in this respect, in order to avoid the differential shading of the quill and feather.

Curcuma and picric acid must be used first, and the orange after, to complete the shade as required. The curcuma bath must be hot; the picric acid requires less heat. The oxalic acid, or sorrel salt, must be finely pulverized before using.

Another coloring matter of some value is the phosphine. It can produce some of the colors above mentioned. It is used in tepid water in an adulterated bath. When the shade is too deep, an oxalic acid hot bath brings it down easily. Dyeing by phosphine is a very easy task, but the colors thus obtained are not so resisting to light as the others indicated.

The green colors are produced by a mixture of yellow and blue coloring matters; also by direct green. But the direct greens are so difficult to handle successfully that the compound greens are generally preferred. The direct greens are of fine appearance and give beautiful shades, but, unfortunately, they are not practically applicable on feathers.

The methyle, malachite, and victoria greens, which give such remarkable colors on silk and wool, are refractory to feathers; they do not take in sufficiently to produce a durable shade, except when the feathers have been prepared by tannin mordant, a complicated and expensive process.

The green of aldehyde is more accessible to feathers, but it is so costly that, notwithstanding the beauty of the shade it produces, the process is rarely applied in trade.

The green-yellow from picric acid, curcuma, and indigo carmine, is obtained by entering the feathers in a bath of sulphuric acid. This is raised to boiling with the picric acid and the curcuma. The indigo carmine is added in voluminous dilution of water. Bath must be always hot to have an equal shade on the feathers.

The verdure, or grass green, is obtained by the same process; and, when the picric acid is added, if a little curcuma is put in at the same time, the shade takes more body, tending to navy green, if desired.

The swan feathers, especially those most in the water, are somewhat harder, and require an extended boiling to have a uniform coloring.

The ordinary green is likewise always obtained by the same combination of the three ingredients—curcuma, picric acid, and carmine indigo. This must predominate somewhat in order to resist the discoloring action of the sun. For feathers of value, the aldehyde green in paste can be used. In this case the process consists in acidulating the bath with sorrel salt or sulphuric acid, whilst gradually adding the coloring matter.

This expensive green is generally used for ostrich feathers, for which bright and uniform colors are generally sought. Generally it is used by the starch process. The vulture feathers are mostly used for dusters, and are only partially dyed—that is to say, at the tops. The green from picric acid, curcuma, and carmine indigo, has in this case the inconvenience of producing a greenish-yellow between the dyed and the white part of the feather. This is caused by the capillarity though the yellow color separates it from the blue. Its solution having less density than the blue solution it runs up alone. The use of direct green in paste obviates this defect, though the cost favors frequent attempts to work the other process. In this case there is a dodge which is sometimes successful. It consists in dyeing yellow first, and green by blue afterwards.

Water green is a bluish-green, very clear. The mixture of picric acid and indigo carmine may suit, but the methyle green furnishes a purer and more uniform cast. The process consists in treating the feathers in sorrel salt and then in a bath of 100°, adding gradually, the methyle green. After dyeing, a small addition of acetic acid raises the color. The acids tends towards yellow shades; this renders the shading easy. The same result is obtained with picric acid. Malachite green and acid green are applied by the same procedure. Ostrich feathers are dyed methyle green in starched cold water. Some feathers are too hard to receive this green unless they are mordanted before in a bath of tannin solution for several hours.

The sky blues are obtained from the carmine indigo. The feathers are plunged in a bath of sorrel salt, or oxalic acid, raised to boiling point. Then a weak solution of carmine indigo is poured in

and agitated strongly. This operation is renewed until the requisite shade is reached. The bath must be kept at 100° or 120°. Generally, indigo carmine gives a sky-blue stronger than the sample. This is corrected by a small dose of violet acid mixed with the indigo.

These shades are generally very fine when the indigo is of a superior quality. Sometimes we have a blue less greenish, an aniline blue, called *bleu lumiere*, is successfully applied. This, however, has the inconvenience of a certain inequality in shades at the downy parts of the feather. Sometimes the two coloring matters are used in combination with success. In this case the dye begins with the carmine indigo and finishing with the aniline blue.

This operation must be conducted with rapidity; otherwise the stem may dye deeper than the feather proper. In case of hardness in the feather, the temperature of the bath must be kept higher up to boiling, according to the condition of the feathers.

Ostrich feathers take the sky blue and *bleu lumiere* by the cold starch water process, as aforesaid. When a glossy tinge is required cochineal or violet acid is used; for a greeny tinge, picric acid answers the purpose well. Ostrich feathers seldom take the uniform dye all over. The inequalities are corrected by dipping the deficient spots in a supplement bath.

The mauve (mallow) shade is obtained from violet blue, shaded with red violet. After a warm bath of oxalic acid, the feather is plunged in a second bath without acid, in which the violet blue is gradually added in dilution. Ostrich feathers always are dyed with starch water, as above indicated. They take any shade, like the others.

The lilac colors are obtained as the precedent; sometimes shades must be brought up by saffrine or fuchsin. Pansy, violet, etc., are of the same odor. The white scale is produced by analogous methods the complimentary dyeing obtained from combinations of blue, violet, yellow, black, etc.

All the natural white feathers have a light yellow tinge. This natural defect is corrected by dyeing like for sky blue, in the lightest density possible. Indigo carmine, prussian blue, violet acid, cochineal, are the combined colors producing the lightest shades on feathers, by the process referred to above.

(To be continued.)

On Vanadium and its Applications in the Tintorial Arts.

The Uria Company of Stockholm, has taken up the manufacture of vanadium preparations for use in the production of aniline black, and offer good and pure compounds at a relatively easy price.

Vanadate of ammonia is offered at £20 per 2 lbs. 3 ozs. = £9 3s. per lb.

A circular issued by the firm gives a list of the purposes for which vanadium has been hitherto applied.

We shall give an abstract of the most important researches on vanadium and its compounds, with remarks on its practical applications.

The discovery of this metal by the Swedish metallurgist Sefstrom, and the investigations of Berzelius on its nature and properties, are well known. Its rarity was for a long time an obstacle to its industrial employment. But when its peculiarly energetic action became known, it was quickly adopted in printing, dyeing and ink-making; and now as it has been found practicable to produce salts of

vanadium at reduced prices, it is probable that it will meet with applications in other branches of industry.

The merit of pointing out vanadium as the most suitable metal for the production of aniline black belongs to the discoverer of this color, John Lightfoot (1870-71). Afterwards Pinkney patented the use of salts of vanadium and uranium along with salts of nickel for the production of aniline black. For several years, however, this proposal remained without practical application, the excessive costliness of vanadium being in the way. In the year 1876 Anthony Guyard called anew the attention of chemists to this new oxidizing agent, and by proving what minute proportions of vanadium were sufficient for the production of aniline black, he showed the possibility of its use on the large scale.

According to him, one part of the muriate of vanadium is sufficient to convert 1,000 parts muriate of aniline into aniline black in presence of the needful proportions of chlorate of potash.

G. Witz, of the industrial school of Rouen, took up the same subject, and carrying his investigations into the minutest details, he introduced vanadium into practice. He found that Guyard's proportions required to be still further reduced. He established with absolute certainty that this new agent produces its effects in perfectly homopatheic doses. He pointed out the numerous advantages which the preparations of vanadium possess over all their rivals, and thus took an important additional step in the technology of aniline black.

Witz found that in practice for 1 kilo. of color, containing 80 grms. muriate of aniline, 1·3 milligramme of vanadium is sufficient for the production of the black. The duration of the process is two to three days, at a temperature of 77° F., with the wet bulb thermometer at 68° F., and the pieces are then completed in the ordinary manner, by passing through bichromate of potash and soda crystals, washing and soaping.

Consequently 61,700 parts of muriate of aniline, or 42,500 parts of aniline oil, requiring merely 1 part of vanadium, and the efficacy of vanadium is 61 times greater than has been asserted by Guyard. Aniline black with vanadium is considerably cheaper than that with sulphuret of copper, as may appear from the following comparison:

Lauth's aniline black is composed as follows:

Water.....	81 pints.
White starch.....	2 lbs. 3 oz.
Calcined starch.....	2 lbs. 3 oz.
Aniline oil.....	2 lbs. 3 oz.
Sal ammoniac.....	171 ozs.
Chlorate of potash.....	171 ozs.

Boil and add when cold sulphuret of copper in paste, 171 ozs. Add before using muriatic acid at 32° Tw., 171 ozs.

Instead of the 171 ozs. sulphuret of copper there may be used with quite as good a result, 1·10,000th part of the weight of vanadate of ammonia, or say three-quarters of a grain. But the 171 ozs. sulphuret of copper will cost about 5d., and the three-quarter grain vanadate of ammonia about a third of a penny.

The practical fact that calcined starch if used as a thickener for aniline black decidedly retards the oxidation of the aniline is well known, and in such cases more chlorate of potash and more

vanadium must be used. For an aniline black for delicate patterns, in which the thickening consists entirely of dark calcined starch, and which contains per kilo. 51 ozs. muriate of aniline, and about 2 ozs. chlorate, 15-100 of a grain of vanadate of ammonia is more than sufficient for 2 lbs. 3 ozs. of color.

As regards the state in which the vanadate of ammonia is introduced into the color, we may add that it is not used as such, since it is sparingly soluble in saline solutions, and is quite insoluble in a solution of sal ammoniac, a salt which almost invariably is present in an aniline black color. It is, therefore, necessary to dissolve the vanadate of ammonia before using it. For this purpose it is treated with ammonia, and in this manner a higher chloride of vanadium is obtained corresponding to vanadic acid. This undergoes decomposition after a time, but more rapidly if heated; chlorine is set free and the compound is reduced to a lower chloride of a fine blue color. As G. Witz proposes, it is preferable to prepare this compound at the outset. For this purpose a reducing agent is required to be added. For instance dissolve 155 grains vanadate of ammonia in 14 oz. muriatic acid, diluted with an equal measure of water, heating the whole gently in a porcelain crucible, and adding small quantities of glycerine, stirring briskly till the liquid is become a dark green, and all undissolved particles have disappeared. Hereupon the solution is diluted with a known measure of water, *e. g.*, 17 pints, and the liquid, which is now a light blue, is preserved in a closed vessel in order to prevent any change in its volume of evaporation. Suppose it is desired to prepare an aniline black with dark calcined starch which requires per 2 lbs. 3 ozs. vanadate of ammonia, then 31 ozs. of this blue solution must be added to 22 lbs. of the color. In this manner a complete and uniform distribution of vanadium in the color is secured.—*Muster Zeitung fur Faerberei.*

Further Information on Printing Aniline Black with Vanadium.

The color thus got up is suitable for all styles; it bears perfectly well to be steamed after ageing, *e. g.*, where it is associated with alizarine steam red. In cases where aniline black is printed along with mordants which are to be afterwards dyed up with alizarine or garancine, the black with vanadium has a decided advantage over that with sulphuret of copper, as the former does not injure the mordants. Further, the colors with vanadium attack the doctors and the cylinders less than do those with sulphuret of copper. These latter have a decided disposition to become oxidized on exposure to the air, forming soluble sulphate of copper, and in that state they are no longer without action on the steel doctors. For the same reason the vanadium colors can be kept better, providing that the proportions previously given are not exceeded. If we consider the regularity with which increased doses of vanadium accelerate the oxidation of the aniline, we find an easy means of regulating the time of the oxidation, *i. e.*, the time of exposure in the ageing room.

We must not forget here to mention an improvement which will doubtless lead to a great extension in the use of aniline black in printing. We mean the discovery of a kind of aniline oil which yields an ungreenable aniline black.

We know the imperfection of the ordinary means proposed to hinder aniline blacks from greening. Thus aniline black, after fixation, is rarely taken through baths of chromate of potash, copperas and sulphuric acid. This procedure, moreover, is only applicable in a limited set of cases. The black superoxidized in this manner certainly does not turn green, but it has lost its beauty and takes a brown, earthy tone. The white of the pieces suffer likewise from the effects of the chrome, and are not easily got clean. The discovery of a special aniline oil which produces a black at the outset and upon which acids and reducing agents have little or no influence will therefore open a new epoch in the history of aniline black.

The conversion of this new product into black, proceeds more slowly than the oxidation of the common aniline, and requires, therefore, a more energetic oxidizing agent. Hence, for this kind of black vanadium is always required in place of sulphuret of copper. The proportion of the vanadium is also larger than for the common black. The composition of the color for an ungreenable aniline black is as follows:—

Water	5,500
White starch	1,250
Dark calcined starch	420
Boil, and when cooled down to 122° Fahr., add—	
New aniline oil	800
Muriatic acid at 32° Tw.	800
When completely cold add—	
Chlorate of soda	420
Boiling water	500
Just before using add—	
Solution of vanadium (as mentioned elsewhere in our present number)	200

Age for two days, take through bichromate of potash 75 grains to 1½ pint of water at 158° Fahr., wash, and soap.

It is better, instead of using the quantities of aniline and muriatic here specified, to neutralize the aniline exactly with the necessary quantity of muriatic acid. In so doing, it is well to make use of the indicator pointed out by Witz, namely, methyl violet. To the 800 parts of aniline oil muriatic acid is added till a few drops of the liquid, added to a very dilute solution of methyl violet in water, turn its color to a greenish blue.

It must not be forgotten that the development of this black requires a higher degree of moisture than the common aniline black. Hence it is useful to add to the color a certain proportion of sal ammoniac—a salt which, on account of its hygroscopic character, plays an important part.

Lastly, a portion of common aniline may be substituted for some of the new aniline oil. This effects in the first place a certain saving, as common aniline is the cheaper of the two; and secondly, the color is more readily developed, whilst the resulting black still retains its ungreenable character, unless, indeed, too much common aniline has been used.—*Chemical Review.*

WE WILL pay 75 cents for January number, 1879; 50 cents for July, 1879; 40 cents for January number, 1880.

On Ostrich Feather Dyeing.

BY PAUL ALEX, PRACTICAL FEATHER DYER.

(Continued from page 134.)

In last month's issue of the TEXTILE COLORIST, under the heading of "Suggestions on Feather Dyeing," is an article containing a recipe for dyeing a garnet. The author of that article begins by saying that garnet shades are most productive, for the reason that they are of the easiest and cheapest class. That sentence shows him to be anything but a good practical dyer; as any feather dyer knows that there are hundreds of colors that are just as easy, and a great many much easier. He should also bear in mind that the coloring of feathers is governed by the shades produced on silks each season.

As far as my judgment and practical knowledge extend, I should decidedly say, that a manufacturer would indeed make a very great mistake who would fill his store with garnet colored feathers, when the leading shades in silks and other goods are of entirely different colors.

He next states that orchilla can be easily and promptly brought to any point required, from reddish-yellow to violet, it being but a mere matter of acidulation. He is right, as far as the changing the color of the orchilla is concerned. The natural hue of orchilla is a violet; by the application of acid the color will immediately change to a Bismark brown; or I might say two or three shades redder—making it a very bad cardinal color. Again, he says that orchilla is not perfect or solid. According to his manipulation it certainly is not, but when properly used it is both solid and perfect. He goes on to say that orchilla must be boiled from fifteen to twenty minutes before using. Now, any dyer who would boil all the substance and lustre out of orchilla cannot surely expect to get good results, or if he does so expect he must have recourse to the use of acids to help him make his color. He likewise says, he enters his feathers at a temperature of from 60° to 100°.

Now, let me ask, where is the use in boiling liquid orchilla for 15 to 20 minutes and not entering your feathers until the temperature has cooled down to 60°?

The writer then goes on to say that the feathers must remain in the bath, as orchilla rises very slowly, from one to two hours. Before proceeding farther I will state here that I will make a garnet in fifteen minutes which will be a fast color, that will stand air, sun-light, or even carbonic acid (which he says will fade his colors).

He next states that when a bath becomes fermented, or, I might add, rotten, he can produce a beautiful shade of maroon with it. I should not care to have a maroon on my feathers like that. He also says that orchilla by itself gives a scale of good garnet. Now, orchilla alone will not produce a garnet at all, but rather a light shade of plum, or a bad shade of purple.

I desire to give to the readers of the TEXTILE COLORIST a recipe for garnet, and I would advise my friend at the other side of the water to try it, and in his next writing report the result.

For, say from half a pound to three pounds of feathers, boil from 2 to 4 lbs. logwood (according to quantity of feathers) for fifteen minutes, or even half an hour, if you are not in a hurry. Then remove the chips from the bottom of the boiler, and taking

your samples in hand pour on orchilla until such time as in your judgment there is enough. Stir it around thoroughly and do not let it boil a moment. Now, enter feathers and let stand until you feel like taking them out, allowing them however, to remain at least fifteen minutes. Then rinse. If a very dark shade is required give a bath of bichromate. Remember that judgment is everything in dyeing.

(To be continued.)

Aniline Black Dyeing by means of Vanadium.

Anthony Guyard was the first to propose vanadium for dyeing an aniline black on fibres of any origin. The beck for dyeing cotton yarns is made up of muriate of aniline, chloride of potash, and a small trace of vanadium. Thus for dyeing 100 lbs. of yarn there are required 5 lbs. muriate of aniline, 2 lbs. chloride of potash, and about 9 grains of the vanadate of ammonia. Witz considers that 1-8,000th part of the weight of the muriate of aniline is the outside quantity that should be used.

The development of the color is relatively the more rapid the larger the quantity of vanadium present, and in this manner the duration of the dyeing process can be regulated at will.

For dyeing silk, Guyard recommends the addition of $\frac{1}{2}$ to 1 oz. gum arabic to the dye bath. In this manner satisfactory results are produced; the silk loses nothing of its brightness, and the dyeing can be completed in one operation.

Wool must be carefully freed from fatty matter, and the dye-beck must contain two to three times more muriate of aniline than that required for cotton. The fixation of the black is finally effected by a passage through bichromate of potash.

It must be remembered that aniline black is of much less value for silk and wool dyeing than for cotton and linen.

Hommeys has published some interesting particulars on the use of vanadium in wool dyeing. If this new agent is employed the previous treatment of the tissue with bichromate of potash, blue vitriol and acid is unnecessary. It is merely required to dye for twenty to thirty minutes in a beck of muriate of aniline, chloride of potash, and vanadate of ammonia, then run through a padding machine and age in a warm room. The next day the dark green that has been formed is converted into a black by being taken through bichromate of potash. A good result is obtained with the following proportions:

10,000 parts water,	
800 "	muriate of aniline,
400 "	chlorate of potash,
50 "	muriatic acid,
1 "	vanadate of ammonia.

For a regular and perfect fixation of the color the author proposes the following routine: The goods are first saturated with the solution of muriate of aniline and chlorate of potash, in the padding machine so as to force the solution right into the fibre. The vanadate of ammonia is then dissolved and added to the bath, and the same process is repeated. This process is also very suitable for mixed goods, cotton and woollen or cotton and silk. As the black is more readily developed on the cotton, shot-effects or patterns may be produced on mixed goods. Thus, if we dye in a dilute

beck and take it afterwards through chromate of potash, the cotton takes a deep violet black, and the wool an olive brownish yellow, which is much admired.

We may mention here certain other reactions and transformations of which the vanadium compounds are capable, and which will doubtless before long be introduced into practice.

Extract of logwood, if treated with chlorate of potash and salts of vanadium, is converted into a yellow coloring matter, which dyes a splendid golden yellow.

Under the same conditions the muriate of (solid) toluidine yields a new coloring matter which imparts to silk a rich bronze color with a coppery lustre.

If in dyeing the ordinary chrome logwood blacks a vanadate of potash is used instead of a chromate, exceedingly fine black shades are obtained.

Catechu browns have been produced with a beck of catechu and chloride of vanadium or vanadate of ammonia.

It is very probable that in the ordinary oxidized catechu colors vanadium might be advantageously substituted for the salts of iron and copper generally used as oxidizing agents. The question of price is of course here the turning point. It is probable, from analogy, that the far greater activity of vanadium might more than compensate for the greater cost per pound.

Vanadium will also probably be of use in the preparation of the naphthylamin colors. This base has in its behavior and reactions a considerable resemblance to aniline, and when oxidized in a corresponding manner it has already yielded a series of greys, browns and modes.

Another reaction, not concerned with the fixation of colors, has been pointed out by Schmid and Baldensperger. These chemists have succeeded in producing magenta with aniline, nitrobenzol, and small quantities of vanadium. The last substance plays here the same part as in the formation of aniline black. It transfers the oxygen of the nitrobenzol to the aniline, just as in aniline blacks it transfers the oxygen of the chlorate of potash to the aniline.

An interesting fact has been recently observed by Professor Roscoe. If finely-powdered vanadic acid is dissolved in boiling concentrated sulphuric acid, and the dark red liquid thus obtained diluted with fifty times its weight of water, and digested with metallic zinc, the coloration runs through all shades from blue or green to a violet. The vanadium is then present in solution in its lowest form of oxidation, and this compound absorbs oxygen with such energy that it discolorizes indigo and other vegetable colors as rapidly as chlorine. It is the most energetic reducing agent known, and as such, will doubtless admit of applications in the tinctorial art.

Application of Vanadium Compounds in the Ink Manufacture.—The solutions of the vanadates of potash, soda, and ammonia, especially the acids salts, yield, if mixed with decoction of galls, a perfectly black liquid, which may be used as ink. Berzelius said of this ink, long ago, that it was the best ink that could be used. It has this advantage over the ordinary black inks (iron inks) that it resists reagents much better. It is not attacked by alkalis unless so concentrated that they destroy the paper. Acids turn it to

a brownish green, but do not destroy it. It is also blacker and flows better than the iron inks, being a true solution, and not like common ink, merely a finely divided precipitate suspended by means of gum water. Like the aniline inks, it does not require gum or any similar body, and consequently it never clogs or forms a coating on the pen, as do the gummed inks. Even after a long time no sediment or deposit appears in vanadium ink. Ten years ago Wagner called anew public attention to vanadium inks, and latterly Boettger has given a receipt for an ink of tannin and vanadate of ammonia. This ink seems to fulfil all the requirements of a safety ink, and if the reduced price is considered, it is not likely to come in much dearer than ordinary inks of good quality.

According to the experiments of Dr. B. W. Gerland, metavanadic acid may be used in the preparation of a substitute for genuine gold bronze. If a solution of sulphate of copper and salamoniac is mixed with vanadate of ammonia and cautiously heated, there is obtained a compound of a splendid gold color, which is deposited from the liquid in the form of gold-colored spangles. These admit of being readily ground up with gum and varnishes, cover well, do not change on exposure to the air, and are in every respect equal to genuine gold bronze.

Vanadium yields also a series of very fine colors, especially adapted for painting on porcelain.

[Chiefly from a circular received from *The Altie bolaget Urda, Stockholm*.—*Chemical Review*.

BLACK ANILINE FOR PRINTING CALICO SHIRTS.—Dissolution of 200 gr. white starch in 1 liter water; 60 gr. tragacanth gum in 1 liter water; 50 gr. roasted starch in 1 liter water. Mix the three syrups and heat to 75°. Dissolve in it chloride of potash in powder. Let it cool and add: sulphur of copper in paste, 150 gr.; mix well and add: sal ammonia, 170 gr.; chlorhydrate of aniline, 480 gr. Mix the whole and pass through a fine sieve and print. The goods must be extended two days in the hot room. When oxidized to bottle green, pass in bath of 2 kilos. sal soda; 2 kilos. bichromate of potash; 500 litres water at 50°.

NEW COLORING MATTERS.—The new greens called *malachite*, which *denise* takes the place of methyl and ethyl, seem to be a lasting success. They have the solidity of *Althéides* with more brilliancy than any of that scale of greens so much praised when discovered, in 1860, by an accidental reaction. Experimenting with Aldehyde on a dissolution of rosaniline M. Zuly; acid given a fine violet. Chepin was advised to try as a reagent the great fixing ingredients of photography—tryposulphite of soda. This produced the famous patented green, now superseded by the *malachite*, which probably will soon be suppressed also by some other new color. The violet colors are likewise overthrowing each other. The French purple of Marais, in 1857, was dethroned by the Perkins violet in 1858. This did well enough for a while under various names: Induline, harnaline, Violine, etc. It sold once as high as \$1000 per kilo. in the dry state. But it is now undersold, and superseded by later improvements under the name of methyleindria, etc. The chemical investigation has open the avenue to a new order of coloring matters. The iridescent styles of *eosine*, which is pink in front and salmon by side reflections, has opened the taste for altogether new shades. Once at work on this task, chemistry will bring out unexpected results—some new specimens, perhaps.—*Textile de Lyon*.

TEXTILE COLORIST.

Dr. M. FRANK, Manager.

PUBLISHER'S NOTICES.

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TEXTILE COLORIST, 506 Arch Street, Philadelphia.

As all our agents and collectors are furnished by us with written authority, we request our friends not to favor those having no credentials from us.

No subscriptions received for less than one year.

SPECIAL NOTICE.

IN ORDER TO AVOID all difficulties hereafter, as well as to facilitate our business, our agents will be required to furnish a postal card addressed to this office, whereby our patrons can notify us directly of what money they have paid an agent, and in what State such payment was made. We will thus be kept duly posted as to the actual state of our business at all times. It is particularly requested that such postal card be forwarded immediately on payment being made to the agent.

IGNORANCE of the primary principles of chemistry amongst our garment dyers too frequently leads to egregious blunders on their part, and vexatious disappointment to their patrons. To such a lamentable extent does this prevail, that many persons have little or no confidence in the promises of dyers to produce the colors they confidently intend. To what is this failure to be attributed, if not to ignorance? A lady of our acquaintance gave ont an alpaca shawl of a bright blue ground, having silk fringe, to be dyed black. The promise was promptly given by the ready dyer—and one would suppose the desired black would be surely obtained on a blue ground. But, what was the lady's surprise to receive back a brown instead of a black? And, stranger still, the silk fringe retained its blue unchanged. This extraordinary failure is evidently one of the consequences of lack of exact information on simple chemical affinities. The dyer's excuse was that he "could not extract the blue." Now, there was no necessity whatever for extracting the blue, for there could not be a readier ground for the black than that color gave. The truth is the failure can be distinctly traced to want of the requisite knowledge on the part of the dyer, and to nothing else. If a physician must be exactly posted in the nature and power of drugs, so should the dyer be thoroughly conversant with the chemicals which appertain to his art, so that his treatment may be sure and satisfactory. The great body of

our dyers are efficient in the theory of this art, and their practice is therefore a matter of mere chance. To keep abreast with the progress of the age they must read, study, experiment, and digest the facts of chemistry, if they would gain the public confidence for the truthfulness of their beautiful art.

WE TRUST that our dyers and dye manufacturers will not lose sight of their interest in the grand exposition to take place in September next, at the Permanent Building, Fairmount Park. In view of the fact that American talent is being universally acknowledged in the various industries of modern civilization, and that our countrymen have held their own in this advanced and progressive day, and even more than that, have carried off premiums from the oldest nations, and the most experienced artisans in many arts and manufactures it becomes us as a great nation to maintain the high stand we have attained, and be ready for every competitor. The prizes offered in our department are not mere transitory rewards in money, on the contrary they are lasting memorials in form of diplomas that will continue to tell their tale of triumph for time to come.

The committee of arrangements have allotted Division I, —for dyes and dyestuffs, and diplomas will be adjudged as follows:

- | | |
|---|---|
| 1. Best Collection Aniline Dyes. | 7. Best Collection Crude Extracted. |
| 2. Best Samples Aniline Green. | 8. Best Sample Crude Extracted. |
| 3. Best Sample Aniline Black. | 9. Best Collection Mineral Dyes and Mordants. |
| 4. Best Sample Aniline Red. | 10. Best Collection Cleansing and Bleaching Agents. |
| 5. Best Sample of Artificial Alizarine | |
| 6. Best Collection Vegetable Coloring Matter. | |

The competition being international, it is to be expected that the display will be one of unique beauty, and in which we trust we shall find our American dyers and dye manufacturers distinguished. At least, the coming event cannot but afford them an opportunity of comparing, and learning by comparison. Here it will be a field of review which will afford to the inquirer a fair examination of the merits of chemicals as applied to the production of certain dyes, and no doubt be conducive to discoveries and improvements leading to higher culture in the art of dyeing.

IN ORDER to protect themselves against any effort to put forth a spurious manufacture of their dye-wood extracts, by any dishonest parties, the Messrs. E. Coez & Co., of St. Denis, France, have notified their patrons in this country that their dye wood extract is only to be had of their sole agents in America, Messrs. J. C. Bloomfield & Co., 11 Dey Street, New York. Their card to this effect will be found in another part of this number.

DYEING DEPARTMENT.

THE MONTH'S PRACTICAL RECIPES.

The following practical recipes, like all that will appear in this department, are verified as reliable and warranted to come out satisfactorily, provided the proportions are strictly adhered to, and the manipulation be workmanlike.

DIRECTIONS, NOTES AND COMMENTS.

☞ We have frequently been asked why we give the names of the makers of the aniline and dye stuffs we use when publishing the recipes accompanying our insets. The reason is: We can speak with authority for those we actually test; where anilines and dyestuffs of the same color, manufactured by other firms, may be equally good, but when treated according to our recipe, may not give similar results. In giving the name of certain manufacturers, therefore, we would not be thought partial to them. Each has his own mode of producing desired effects with his own dye stuffs.

Recipe No. 99.

BOTTLE GREEN ON RAW COTTON FROM THE BALE.

100 lbs. Cotton.

1st Bath: 2 lbs. Blue Vitriol.

Enter cotton and boil for 4 hour.

2d Bath: 3 lbs. Extract Logwood,

2 lbs. Extract Fustic,

1 lb. Soda Ash.

Enter cotton and boil for 4 hour, wash and finish.

Recipe No. 100.

WOOD ORANGE ON RAW COTTON FROM THE BALE.

100 lbs. Cotton.

Boil 12 lbs. Hypernic,

4 ozs. Madder,

2 ozs. Flavine,

6 gills Yellow Spirits.

Boil for 1 hour, wash well and done.

Recipe No. 101.

CLARET BROWN ON LOOSE WOOL.

100 lbs. Wool.

1st Bath: 1½ lbs. Bichromate of Potash.

Enter wool, work well for 4 hour, wash out thoroughly.

2d Bath: 20 lbs. Logwood,

10 lbs. Hypernic,

1 lb. Extract Fustic.

Boil for 4 hour, and done.

Recipe No. 102.

ALKALI BLUE ON WORSTED.

70 lbs. Yarn.

Boil up 1½ lbs. Borax,

5 ozs. Alkali Blue 2 B. Z. { Actien Gesellschaft, Berlin.
H. A. Gould,
Boston, New York and Phila.

Enter yarn at 140° F., turn for 4 hour, wash and finish in sour bath of 2 lbs. Sulphuric Acid at 160° F., give 4 turns, wash.

Recipe No. 103.

PINK ON COTTON.

50 lbs. Bleached Yarn.

Dissolve 5 lbs. Glauber salt,

4 ozs. Pink { Badische Aniline and Soda Fabrik.
Wm. Pickhardt & Kuttroff,
New York, Boston and Philada.

Enter at 110° F., turn well, hang up, raise temperature to 140° F., and finish.

Note.—The dye stuff should not be added all at once.

Recipe No. 104.

EMERALD GREEN ON WORSTED.

50 lbs. Yarn.

Clear the bath well, add:

6 ozs. Emerald Green, { Badische Aniline and Soda Fabrik.
Wm. Pickhardt & Kuttroff,
New York, Boston and Philada.

4 ozs. Sulphuric Acid.

Enter yarn at 160° F., turn continually while raising temperature to 180° F.

☞ This new product of the Badische Aniline and Soda Fabrik is a superior article and exceedingly cheap. We advise dyers to try it.

Recipe No. 105.

GOLD BRONZE ON WORSTED.

25 lbs. Rovings.

Boil 3 lbs. Glauber salt,

½ lb. Tartar,

½ lb. Alum,

2 ozs. Yellow N. { Boston Dyewood and Chemical Co.
Boston.

2 ozs. Archil Extract,

½ lb. Indigo Paste.

Enter rovings at 160° F., turn to shade while raising temperature.

Note.—By using less archil and indigo a very good old gold can be produced.

Recipe No. 106.

GREEN OMBRE ON WORSTED.

25 lbs. Yarn.

Enter yarn at 150° F.

1st Shade: 1½ lbs. Oil of Vitriol,

½ oz. Acid Green.

2d Shade: 4 oz. Acid Green.

3d Shade: 1½ ozs. Acid Green.

4th Shade: 3 ozs. Acid Green.

5th Shade: 1 lb. Indigo Carmine,

2 ozs. Picric Acid,

3 lbs. Glauber salt.

For more explicit manipulation see Recipe 61, Vol. I, 1879.

Recipe No. 107.

NAVY BLUE ON COTTON.

40 lbs. Yarn.

1st Bath, cold:

6 lbs. Nitrate of Iron, (E. Oakes & Co., N. Y. and Phila.

Give 6 turns and wring.

2d Bath, at 100° F.:

3 lbs. Yellow Prussiate of Potash.

Give 6 turns, wring, and repeat through 1st and 2d bath without any addition.

3d Bath, at 150° F.:

6 buckets Logwood,

2 lbs. Alum.

Give 6 turns and wring.

(Continued on page 157.)

99



100



101



102



103



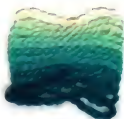
104



105



106



107



108



109



110



PRICES CURRENT.

PHILADELPHIA, JULY, 1880.

DYES AND DYESTUFFS.

	lb.	5	6	8
Acetic Acid.....	4	50	60	
Albumen, Blood.....	4	85	95	
Albumen, Egg.....	4	21	02 1/2	
Alum, ground.....	4	31	31	
Alum, lump.....	4	31	40	
Annatto, prime.....	4	1 80	1 50	
Annattoine.....	4	36	30	
Aniline Oil, English.....	4	38	38	
Aniline Oil, French.....	4	38	50	
Aniline Salt, crystals.....	4	22	30	
Aniline Salt, cake.....	4	16	25	
Argol, crude Oxy.....	4	7	10	
Argol, crude Sicily.....	4	16	30	
Argol, refined St. Ant. Brown.....	4	28	32	
Argol, refined (gray).....	4	30	33	
Argol, refined Light.....	4	28	32	
Aqua Ammonia.....	4	5 1/2	6 1/2	
Aqua Ammonia, F. F. F.....	4	6	8	
Aurine.....	4	75	90	
Barbary Root.....	4	6	5 1/2	
Barwood.....	4	23	23	
Bi-Chromate Potash.....	4	13	14	
Bleaching Powder.....	4	10	13	
Borax, refined.....	4	10	13	
Brazil Wood.....	4	3	3	
Blue Vitriol.....	4	7 1/2	8 1/2	
Brimstone, roll.....	4	3 1/2	3 1/2	
Camwood, pure.....	4	8	10	
Camwood, No. 1.....	4	8	10	
Carbonate of Ammonia.....	4	20	21	
Caustic Soda, 50 per cent.....	4	4	5 1/2	
Caustic Soda, 70 per cent and over.....	4	4	5 1/2	
China Clay.....	4	20	24 00	
Citric Acid.....	4	90	95	
Cochineal, Honduras.....	4	70	75	
Cochineal, Mexican.....	4	65	70	
Cochineal, Black Teneriffe.....	4	70	75	
Copperas.....	4	1	1 1/2	
Cream Tartar, crystals.....	4	36	38	
Cream Tartar, powdered.....	4	36	38	
Crimson Spirit.....	4	13	14	
Cudbear, pure.....	4	20	25	
Cudbear, No. 1.....	4	15	16	
Cudbear, No. 1, French.....	4	23	28	
Cutch.....	4	10 1/2	11 1/2	
Exalt Diyl.....	4	50 00	50 00	
Exalting Acid.....	4	13	10 1/2	
Extract Fustic.....	4	19	20	
Extract Hyperic.....	4	16	18	
Extract Indigo.....	4	16	18	
Extract Logwood, bulk.....	4	7	9 1/2	
Extract Quercitron.....	4	25	30	
Flavine.....	4	11	12	
Fustic, Cuba.....	4	11	12	
Fustic, Maracabo.....	4	11	12	
Fustic, Havana.....	4	6	7	
Gambler, bales.....	4	11	12	
Glauber's.....	4	11	12	
Green Ebony.....	4	31	4	
Hyperic.....	4	31	4	
Irish Moss.....	4	4	6	
Iron Nitrate.....	4	6	8	
Indigo, Auxillary.....	4	1 45	1 85	
Indigo, Bengal.....	4	95	1 10	
Indigo, Caracass, fine.....	4	1 35	1 60	
Indigo, Guatemala, fine.....	4	95	1 05	
Indigo, Madras, fine.....	4	85	95	
Indigo, Manila.....	4	18	22	
Lac Dye, fine powdered.....	4	10	15	
Lac Dye, good powdered.....	4	10	15	
Lima Wood.....	4	14	14	
Logwood, Campechey.....	4	2	2 1/2	
Logwood, Honduras.....	4	2	2 1/2	
Logwood, Logwood.....	4	2	2 1/2	
Logwood, St. Domingo.....	4	11	12 1/2	
Madder, Dutch.....	4	7	8 1/2	
Madder, French.....	4	7	8 1/2	
Maple Bark.....	4	2	2 1/2	
Marble Dust.....	4	1 50	1 75	

Myrabolans.....	4	5	6
Muriatic Acid.....	4	13	2 1/2
Muriate Tin.....	4	19	22
Muriate Tin, strong.....	4	19	24
Muriate Tin, oxy.....	4	21	24
Muriate Tin, crystals.....	4	21	3
Nicewood.....	4	7	9
Nitrate Iron, pure.....	4	11 1/2	12 1/2
Nitric Acid, (Aqua Fortis).....	4	26	28
Nitric Acid, Aleppo.....	4	16	22
Orcinell.....	4	10	11
Oxalic Acid.....	4	20	28
Pearl Ashes.....	4	46	50
Persian Berries.....	4	57	61
Pieric Acid.....	4	65	70
Potashes.....	4	13	2
Prussiate Potash, yellow.....	4	27	31
Prussiate Potash, red.....	4	65	70
Quercitron.....	4	13	2
Redwood.....	4	27	31
Red Sanders.....	4	3	4
Stannate of Soda.....	4	18	20
Starch, Corn.....	4	4	6
Starch, Potato.....	4	6	9
Starch, Wheat.....	4	6	9
Safflower.....	4	24	40 1/2
Safflower extract.....	4	7 00	8 00
Sol Ammoniac.....	4	13	13
Sol Soda.....	4	11	2
Sapanwood, ground.....	4	24	3
Soluble Blue.....	4	60	80
Sugar Lead, brown.....	4	104	11
Sugar Lead, white.....	4	75	80
Sunac, Sicily, according to grade.....	4	50 00	55 00
Sunac, Va.....	4	50 00	55 00
Soda Ash.....	4	11	2 1/2
Sulphuric Acid.....	4	55	60
Tartaric Acid.....	4	41	6
Terra Japonica.....	4	7	8 1/2
Turner's.....	4	13	25
Ultramarine.....	4	30	35
Verdigris.....	4	10	12
Wood.....	4	10	12

BUSINESS OPPORTUNITIES.

F. J. BIRD, AUTHOR OF THE DYER'S HAND BOOK, is prepared to furnish reliable recipes in any branch of Dyeing, and will have pleasure in matching to any color or shade for special colorings of his new Aniline Colors. See advertisement, page 6.

Address, 512 St. Marks Ave., Brooklyn, N. Y.
 A COPPER CYLINDER, 6 1/2 inch by 3 inch, in good order, for sale cheap, 710 North 11th St., Philadelphia.

FALSE PRETENSES.

We are in receipt of a letter from the proprietors of the Derwent Meadow Dye Works, Derby, Eng., stating that they and others, have paid subscriptions to a man named M. Hodgson, an agent of the TEXTILE COLORIST. We have no agent in England at present, and have no knowledge of any person of that name.

Catechu Brown for Madder.—(French). 1 1/2 gallons water, 1 pint acetic acid at 8°, 2 1/2 lbs. catechu¹ boil, dissolve, and add 3 1/2 lbs. salmonic, 1 pint acetate of lime liquor, 7 lbs. gum senegal; when cold, add 10 ozs. nitrate of copper at 90°. The acetate of lime liquor is made as follows: 2 1/2 lbs. lime, slaked; 3 quarts acetic acid; use the clear. The acetate of lime will resolve itself by the nitrate of copper into nitrate of lime and acetate of copper. The nitrate of lime being a deliquescent salt, will keep the color soft, and help its ageing.

(Continued from page 154)

Recipe No. 108.

GREEN ON COTTON.

40 lbs. Yarn.

1st Bath, cold:

5 lbs. Nitrate of Iron.	{ E. Oakes & Co. N. Y. and Phila.

2d Bath, at 100° F.:

3 lbs. Yellow Prussiate of Potash,
2 lbs. Sulphuric Acid.

3d Bath, at 150° F.:

1 lb. Flavine,
1 lb. Indigo Neutral,
2 buckets Logwood.

The manipulation throughout the same as Recipe No. 107.

Recipe No. 109.

NAPHTHOL YELLOW ON WORSTED.

10 lbs. Rovings.

Boll 1½ lbs. Glaubersalt,

½ lb. Sulphuric Acid,

{	Badische Aniline and Soda Fabrik.
	Wm. Pickhardt & Kuttroff,
	New York, Boston and Philada.

Enter at 170° F. and turn to shade.

Recipe No. 110.

LIGHT LILAC ON WORSTED.

25 lbs. Yarn.

Clear the bath then add:

5 lbs. Glaubersalt,

2 ozs. Red Tartar,

1 lb. Sulphuric Acid,

{	Meister, Lucius & Bruening, Hochst, A.-M.
	Lutz & Meyers,
	New York, Boston and Philada.

1½ ozs. Indigo Paste,

1½ ozs. Archil Extract.

Enter yarn at 150° F., turn rapidly while raising temperature to 190° F., and turn to shade.

Improvements in the Oxidation Process in Aniline Black Dyeing.

Theilig and Klaus propose the following process for dyeing cotton wool and yarns. The goods are saturated with muriate of aniline, chloride of potash, or another oxidizing agent, and chloride of vanadium or other metallic salt required for developing aniline black, and they are then pressed or wrung to remove the superfluous liquid, which can be used for other lots of cotton. The goods are then placed in a close apparatus, and exposed to the passage of a continuous stream of hot air. After the fibre has reached a certain degree of dryness, hot steam is added to the hot air. The acids liberated during this operation are swept away by the current of air and steam. If necessary, ammonia can be also introduced in order to neutralize the liberated acids. The current of air and steam effects the oxidation of the aniline rapidly and thoroughly, and prevents any damage to the fibre by the acids liberated. As soon as the oxidation in the above-mentioned apparatus is finished the goods are taken through a bath of chromate or of an alkali. Finally the dyed fibre is treated in the ordinary manner with soap, etc., and dried.—*Chemiker Zeitung*.

NOTES OF THE MONTH.

All communications under this head will meet with due attention, and coloring matters will be fairly tested.

WE HAVE MADE several tests with J. Tiers Myers & Co.'s Castiline, and found it a valuable adjunct in dyeing raw cotton, black or brown. It has the tendency to develop the color, softening the cotton, and is of great advantage to the spinner. There is no extra labor in using Castiline when dyeing, as it is put directly into the dye-bath; and, as the expense is trifling, compared with the benefit derived from its use, we advise dyers and manufacturers who dye raw stock to try it. We will further investigate this article and will produce samples ere long.

JOH. RUD. GEIGY, of Basel, Switzerland, represented by Fischer & Keller, N. Y., has produced a new mordant for cotton called Elaidine.

WE are informed that the special mordant for dyeing scarlet on cotton (called Imperial Mordant) manufactured by E. Sehlbach & Co., N. Y., gives entire satisfaction. The object of this mordant is for the purpose of using their Wool Imperial Red and Orange on cotton. The dyeing of Wool Red on cotton seems to produce a more brilliant color.

THE experiments made with J. C. Bloomfield & Co.'s French Extract of Madder has brought very encouraging results in Turkey Red dyeing, it is cheaper than Alizarine, and no doubt ere long will produce equally as bright colors.

PICKHARDT & KUTTROFF are introducing, with great success, Alizarine for wool dyeing. We expect from this firm, ere long, samples of their new product Artificial Indigo, now manufactured at the Badische Aniline and Soda Fabrik, and the experiments up to date, we are informed have given satisfactory results.

ALEXANDER BARILL, N. Y., agent for Puteaux Blue, contemplates visiting the manufacturers and dyers to show them the superiority of Puteaux Blues over all others now in the market. There is no doubt of its merits.

WE have received from Pickhardt & Kuttroff samples of Azo-benzol Fast Crimson R. B. patented, Nicholson Pure Blue R. B., Cotton Blue, 3. We will test and produce samples soon.

QUERIES AND REPLIES.

Under this head we invite all our friends to make their inquiries on every subject connected with dyeing, etc., and we will endeavor to give them such information in answer as they are in need of. We also invite others to give us the aid of their experience in such replies. All will be welcome.

QUERIES.

73. Is there such a term as "Mango," and for what is it used?

J. C. D.

74. I have been told that the leaves of the potato plant are good for thickening colors. Please inform me how they are used?

L. N.

75. What is "Terra Merita?"

QUERIST.

ANSWERS.

73. Bleaching powder and liquor are called Mango in the north of Ireland linen districts.

74. We do not know that they are used in this country for that purpose; but in France they either bake or roast the potato leaves, and then apply them in the thickening process, with very good effect.

75. "Terra Merita" is a new name for turmeric.

CORRESPONDENCE.

Mr. Bird's Prizes.

Among the prizes, aggregating six hundred dollars, which Mr. F. J. Bird offered through these columns in February last, was one which read as follows: "I will give one hundred dollars for a formula by which *rags* can be bleached from wool dark stock to a light drab or gray (as per sample to be supplied by me), at a cost of about 1-cent per lb., provided that the fibre be not injured thereby."

In reference to this particular item in the prizes in question, we have received a letter which we deem but justice to the writer to lay before our readers (at his request), our columns being the medium through which the offer was made. It is as follows:

FLATBUSH, L. I., June 23d, 1880.

DR. M. FRANK:

Dear Sir.—I write you these few lines in reference to the \$600 prizes offered by Mr. Bird in your number of the TEXTILE COLORIST, Feb. 1880, page 41. (The advertisement saying, "I will give \$100 for a formula, etc.") Then I wrote to Mr. Bird, who sent me an answer* with sample of the dark stock he wanted to have bleached, as a type. I enclose both samples and letter. Sometime after, I brought him his sample of dark stock bleached by my process, of which I enclose you a sample. I told Mr. Bird that the bleaching was about 1-cent per lb., and would require about two hours, the fibre not being injured. He kept the bleached wool to have it carded, and a few days after I received a letter† from Mr. Bird, which you will please find enclosed (dated May 26th, 1880).

Now, I claim that I did fulfil all the requirements of Mr. Bird, in his advertisement, as nothing was said about one or two liquors, and if he acted squarely I was entitled to the prize he offered.

I wish you would mention these particulars in your paper, as it was both tedious and expensive to make experiments, and after having succeeded to be deceived in this way.

Yours, very respectfully, JOHN LAMBERT.

P. S.—I may mention to you, that the wool bleached by my process will answer very well with either wood or aniline colors.

[Mr. Lambert having enclosed for our inspection a specimen of "the dark stock to bleach," "the bleached dark stock by Mr. Bird," and a sample of the latter as bleached by his (Mr. L.'s) process, we are in fairness bound to say we consider the same a decided success; and that, as Mr. Bird has not made any proviso as to the number of liquors in that particular requirement, Mr. Lambert is justly entitled to his \$100.—Ed.]

Pure Water for Dyeing.

The requisite of perfectly pure water is one which dyers may sigh for, but never obtain; for, water is so subject to existing matters which tend to render it more or less impure that where one is absent others take its place, and in fact, perfectly pure water is a theory, rather than an absolute fact. It is true that we have

several modes of rendering water pure (so to speak), but all these are necessarily expensive, for the simple reason that they have to be carried out on a large scale and with critical care.

It is evident that for the production of pure colors, pure water is necessary; and when we examine into the constitution of various waters, if not water in general, we find out innumerable difficulties in the way of a procurement of actually pure water. When we consider that besides taking up impurities from the medium through which it passes, it likewise holds in solution the vapors and gases of the atmosphere to which it is exposed, there surely cannot exist any doubt as to its state of impurity. Of the acquired matter which tends most to this state of impurity that which is soluble is most to be feared, for it becomes thoroughly incorporated with the water, and changes its constitution, whilst the matter merely held in suspension, settles eventually, and is easily removed. The latter consists in clay, sand, sulphurets, and oxide of iron, as well as debris generally.

It is highly necessary that the water to be used in dyeing should be carefully analyzed by a competent expert, and such correctives employed as will tend to purify it. The first object is filtration, then tests may be applied as follows:

For the detection of alkaline sulphides, add a few drops of a solution of the nitro-prussiate of potassium. If the alkaline sulphides be present a fine violet tinge will be the consequence. If salts of iron should be apprehended, the concentration of the water, by evaporation in a white porcelain dish, will display the deposit of a yellowish matter.

Add a solution of galls, in order to detect any browning or bleakening appearance. If iron should be present, add a mixture of the red and yellow prussiates, when a blue coloration will appear. Should there chance to be any sulphuric acid present, a few drops of pure nitric acid, followed by a solution of chloride of barium; a white precipitate will show itself. Of course, all or any of those foreign matters, may not be found in the water used by dyers in cities, where hydrant water is used; but those who use the water of rivers, streams, or lakes, where there is a liability to be troubled with the presence of injurious refuse, or any impurities whatsoever, derived from sources beyond control, should be tested. Although large sheets of water, such as the lakes and ponds, presenting large surface on which the sun may act as a filtering medium by evaporation, are the best supplies of water for dyeing purposes, we must look to the interest of those numerous dyers who have not that privilege, but have to depend upon the precarious condition of the water-works supply.

Filtration being undoubtedly the most efficient means of purification of water, and although there are many contrivances, we will now proceed to give what we consider the most economical mode of effecting this most desirable purpose. A cistern capable of holding, say twelve thousand gallons, should be erected to such a height as would give room for a filtering deck at about three-fourths of its height. This deck should be of slate, as the cistern itself should be; the walling being of brick well laid in Portland cement. The slate deck should have as many holes in it as will give a fair passage to

* The following is the letter referred to:

MR. J. LAMBERT:
Dear Sir.—I enclose sample of the dark stock and sample of the color I can get it. If you can get it lighter, I can let you have some to try; and if that is successful we will put a kettleful through. When, if it accords with the requirements as per TEXTILE COLORIST, as to cost, time and strength, I shall be happy to hand you the prize.

Yours truly, F. J. BIRD.

† This is Mr. Bird's letter:

MR. J. LAMBERT:
Dear Sir.—I am sorry to say your process would be of no practical use to me, from the fact of its requiring two liquors.

Yours truly, F. J. BIRD.

the water without endangering the strength of the slate, which should be two or three inches thick. On the slate deck there should be laid a bed of moderately large flint stones, the interstices filled with coarse gravel, and a surface of clean sharp sand. On this the water is to be poured, being filled up to the top. Within an inch and a half of the bottom of the reservoir a spigot or spigots should be firmly set to draw off the water. The object in placing the spigots an inch and a half from the bottom, is to admit of the settlement of any sediment in the filtered water on the bottom, instead of passing through the spigots. This bottom should be carefully cleaned out as often as desirable. The filtering deck should also be cleaned from all impurities, by washing the flint stones and renewing the sand coatings.

Some may deem it too expensive to erect such a suitable water-tank, but such persons might as well do without a steam apparatus.

We do not address ourselves to any but those who have ambition to excel in textile coloring, and to such we need not say that pure water (and when we say pure, we mean to convey the full idea of perfection as near as it can be obtained), for, after all, water, pure water is the surest element of success in the production of clear, bright colors; and, on the contrary, the least impurity in the water used in dyeing largely contributes to the failures of that dye to produce its desired effect.

Added to the tests we have already given is that for the detection of lime in the water, which is most effectually done by adding to the concentrated water some oxalate of ammonia. It may be at once recognized if, after standing a few minutes, a white precipitate falls. Thus, we can readily discover impurities and know how to correct them. But, where there is a choice of water, the old adage will stand good,—prevention is better than cure. We would do well therefore, to avoid that water which is most impure, and that which is least objectionable, even though the former be easier of access than the latter.

By boiling the questionable water, the presence of magnesia can be easily ascertained; for, the free carbonic acid is expelled and precipitation exposes the magnesia. A trifling addition of oxalic acid will be certain to correct this objectionable presence in water.

When organic matter in a soluble state is present a few drops of permanganate of potash may be added, thus forming a hydrated peroxide of manganese in the form of a brown precipitate.

As to the hardness of water, that is dependent altogether on the amount of earthy matter present either as lime, magnesia, iron or alumina, for the detection of which we should have recourse to the soap-test as the best and most reliable. The mode of procedure is as follows:

Mix methylated spirits (free from shellac) with an equal quantity of water, at the same time adding a due proportion of soap. The purest water is required for the establishment of the actual value of this soap solution. For this purpose rub some sulphate of lime down to a very fine powder; put 27.5 grains of it into a full gallon of pure water, letting it dissolve. This is called "Clark's process," that being the name of the inventor, who designated it—"standard water of 16° hardness," every grain of carbonate of lime or other hardening matter being counted as one degree of hardness.

As soon as this standard water is prepared, put into a six ounce glass-stopper bottle 1000 measures, adding 40 grain measures of a cold saturated solution of carbonate of soda crystals. Meanwhile a poncette should be filled with the foregoing soap solution, this to be carefully dropped into the bottle until the point of saturation is attained; to ascertain this the bottle is to be briskly shaken from time to time.

When a soft rich lather is formed which will hold for five minutes, the operation is complete, and the number of degrees consumed read off. A shorter and more ready method is to note if 32° of the soap liquor has been used, if so 2° of the poncettes stands for 1° of hardness. Thus, the value of the soap liquid becoming known, it may be applied with certainty to the testing of waters.

One thousand grain measures of the samples are placed in a bottle mixed with forty grain measures of the carbonate of soda solution and the soap liquid added, as above.

Should the hardness of the water be more than 16°, it ought to be previously diluted with equal to, or double, its bulk of distilled water. In making the examination afterwards, the result should be divided by 2 or 3, according to the extent of dilution.

When this examination is carefully carried out, we very clearly show the exact value of a water for cleansing and scouring purposes. The less soap used the better for the production of a lather.

It may here be remarked that for dyeing and printing, as well as for the extraction of colors, (excepting sad colors) a very hard water is not at all good, on the contrary, it is positively pernicious.

Should the water be drawn from a well or spring it would be judicious to test it, both cold and boiled.

Again, a very soft water may be as bad for coloring as hard water is, especially if the soft water be charged with alkali.

To make a standard extract of logwood, by digesting distilled water upon an excess of rasped logwood in a closely stoppered bottle. If it be desired to examine a number of samples of water, provide a set of clear white glass phials holding a little more than 4 ozs. Into one of these phials put 4 ozs. of distilled water, adding 100 grain measures of the logwood liquor. Now put 4 ozs. of each sample in one of the other bottles and add 100 grains of logwood liquor to each, comparing the colors. It will be at once seen that the phial with distilled water is of a clear reddish amber color, all the others being in a gradually lesser degree of strength of colors, according to the amount of their impurities. If the water contains a soluble chloride it will be yellower than with pure water. A yellowish olive hue is imparted to it by the presence of sulphate of lime and alkaline sulphates. Alkalies (caustic or carbonated) give a brownish red; salts of alumina, a maroon approaching a plum color; free acids, a cherry; and salts of iron and chromates, a brownish-black. All these are divisible into other shades or tints of color which are easily estimated—at least approximately.

It is very evident then that we possess all the means of discovering the uninvestigated impurities in water, and the removal of those impurities and classifying of them is simply a matter of mechanical effort though the means of the filterer.

Use of Superphosphates in Silk Dyeing.

The 19th century is decidedly an age of progress. Silk dyeing is a proof of it, for, like the wandering Jew, it advances always, and without stopping. Where will it stop? No one can foresee, if we may judge from a product which comes, it is said, from Germany, and which one of our correspondents has requested us to examine.

This product has not a very enticing look. Its odor, scantily agreeable, recalls that of manure; its appearance is that of ill-mixed mortar, moist and mixed with carbonaceous matter. The dealers, disdaining the proverb that fine feathers make fine birds, and confiding in its goodness, say to themselves that "the crow does not make the monk." It is for dyers to appreciate this product.

As for us, we prefer to believe that our correspondent has been mistaken in sending us this sample, which is nothing else but superphosphate of lime, rich and moist, as it is supplied to farmers. On washing it in cold water it leaves, after filtering, a mixture, an abundant residue of sulphate of lime upon the filter, whilst the liquid which passes through is biphosphate of lime, the substance intended to act in dyeing. For weighting, it will be asked, what will not be invented for this purpose? We are then got to use manures in tinctorial operations. Where shall we stop in this direction? Will silk dyeing in future resolve itself into dunging,* followed by weeding, watering, etc.? We must despair of nothing.

To conclude, let us give a simple advice to the sellers of this wonder-working product. In place of the crude manure why not extract the active portion, the biphosphate of lime, and sell it in that form to the dyers? The appearance will certainly be improved. The sulphate of lime is only in the way of the dyers. If it is in the hope of puzzling chemists that the article is sold in its rough state, the makers must have a very low idea of chemical skill.

Still a word, and we will leave our readers to use the biphosphate of lime for weighting silks if so disposed. As far back as 1864 we advised the use of biphosphate of lime instead of soap for boiling silk. In fact, the gum of silk, composed of oselone (a body analogous to gelatine) and of albuminate of lime, dissolves in boiling and dilute solutions of biphosphate of lime, as well as in boiling soap lye, and in the same proportions.

For weighting silk concentrated biphosphate of lime, added to the bath before boiling, should, according to our correspondent, act like the bichloride of tin. This is a saying which we shall endeavor to verify.—*Textile de Lyon.*

Bleaching and Dyeing.

(Continued from page 145).

The theory of bleaching by chloride of lime has not yet been satisfactorily defined. Chemists are divided as to the positive acting principle of the oxidizing agents. Even the relative function of chlorine in union with lime is still unexplained and uncomprehended. Some consider it as being that of hypochlorite of lime, Ca O, Cl , united with chloride of calcium, Ca Cl . Others regard it as a combination of chlorine with oxide of calcium under the form of oxychloride, Ca Ocl .

Whatever may indicate the formula, it cannot really demonstrate the chemical necessity of lime in union with chlorine. This is the only bleaching power in the association. It generates the oxidizing oxygen in its nascent state, and removes the hydrogenous matters from the fibrous material, so discolored and bleached.

*The writer forgets that dunging has long been used in calico printing.

Lime has no favoring influence in this operation; it rather injures the fabric by its astringent and metallic action, combined with acidulation. The harshness and yellowish tinge of cotton yarn after a certain period of bleaching, are caused by the silicious and contracting nature of lime. Lime is not an accepted chemical adjunct with chlorine; it is merely tolerated as a vehicular conductor until a more congenial associate is discovered. Being well aware of this radical defect, chemistry is laboring to create an adequate substitute, having the molecular advantage of lime with a real bleaching power in combination with that of chlorine.

The proper and logical quality of a bleaching compound is that of being detergent and not astringent, as the oxide of calcium is by nature. The cells of vegetable fibres must be open, inflated, and not closed or contracted. The bleaching bath ought to be solvent, discolored and bleaching at the same time. This is not the case with the present system of bleaching. The fabric is forcibly bleached by a violent oxidizing of oxygen acting on fibre contracted by the effect of lime. The consequence is that this bleaching is a latent combustion which is immediately visible on delicate fabrics. This is the reason why ladies object to having their fine lace and rich linen treated by the chloride of lime. They pertinently call it "a burning bleach." The *Scientific American* lately mentioned the fact that the bagasse fibre could be turned into paper stock if it could be bleached properly, and that the difficulty of doing so counteracted this utilization of that sugar cane refuse. This illustrates the crude method of bleaching vegetable fibre. The bagasse is very knotty, and the hard knots, still made, harder by the astringency of chloride of lime, cannot be penetrated by the oxidizing bleach without reaching the point of destruction, called appropriately by professionals "death-bleach."

Forced in chlorometric degree, the bleaching bath penetrates in the compact fibre at the expense of its cellular constitution. It decomposes and dissociates the cellulose into a dust. But this being done exclusively to the disorganizing influence of lime, there is no reason why it could not be suppressed, and a proper treatment of the bagasse and other similar fibrous materials obtained. We have seen some beautifully treated by a new method, having no calcium in it; and the result was so perfect that the white fibre, so flexible and strong, is certainly capable of being spun into good yarn for carpets or cordage. The *American Textile Manufacturer* of last February has reported this fact, which can be yet demonstrated to any interested party.

The saccharine saturation of this cane refuse forms, in connection with chloride of lime, a saccharate of calcium equivalent to a destructive mordant after the evolutions of chlorine. The same occurrence takes place with jute under a different name. Jute is the hardest fibre to bleach by the ordinary process. Its refractory power is derived from the oxalic and albuminous tannin contained in the fibre. It forms, with lime as an astringent, an acidulated tannate of calcium, which acts almost as a *recet*. This fact is not only illustrated by the difficulty of penetrating the cells in the bleach, but also by the rapid deterioration of the dye on jute carpet. It holds no fast color, for the reason that it contains an insidious counteraction proceeding from the latent combustion produced

by oxygen combined with the tannate of calcium. Can this be remedied? We answer in the affirmative. Jute is erroneously considered as a common weak fibre. When treated rationally, it is so fine, strong and silky that plush velvet and soft fabrics can be made from it; besides its adaptability for linen mixture. But of course chloride of lime cannot enter into the process. These remarks are not based on mere supposition, nor on laboratory experiments. They are derived from actual, practical facts, yet generally unknown in America, and kept secret in Europe. There are yet but a few manufacturers in England and France working quietly but successfully on these rational principles. They made large fortunes in a few years by substituting new methods for the old, roundabout and very crude way of treating fibres, especially jute, which affords more resources than is generally supposed. As remarked above, a rational bleaching bath must be based on a detergent liquid. The water must be made solvent, and not astringent, while it carries the ozone or oxygen generator. The patent of chlorozone is leased on this principle, and it really acts accordingly. The only drawback of chlorozone in this country was the slowness of its operation. Twelve hours has been considered as too slow. Working, in view of correcting this defect, the manufacturer has recently discovered the way for hastening the effect of this remarkable bleaching liquid. Cotton yarn, or fabric, can now be bleached in two or three hours, and jute in six hours, with the important advantage of a chemical disintegrator and a division of the clumsy fibre. For softness, whiteness and strength the fabric could find no equal to this chemical agent. Lace or fine linen can be washed and bleached in a weak solution of chlorozone in a few minutes by simple agitation. No impairing, no disorganization of any kind in the fibre; quite the reverse, being detergent and discolored by the solvent liquid, while the ozone or oxygen is limited, the fibre is freed from all silicious and albuminous or greasy matters kept on by hydrogen. It is therefore supple, elastic and white as when in its nascent state in the plant.

We have said that all vegetable fibres are made white by nature, and while in the growing state. This fact is renewed artificially by the action of chlorozone operating as a purifier and bleacher on the hydrogenated fabric. Vegetable fibre, in its pure state, is generally composed of equal parts of carbon and oxygen with a fraction of hydrogen. But when out of its natural condition and exposed to the vicissitudes of temperature, the hydrogen sets in copiously, and in combination with other agencies of the air deteriorates and darkens the fibre.

The chlorozone has the valuable properties of eliminating without destroying all foreign matters incrustated in the fabric. The best evidence of its superiority over chloride of lime can be obtained by a simple test. The chlorozone bath, made of one part of liquor in forty parts of water, will, through emulsion, discharge the fibre from all its coloring matters, and open it so as to produce flexibility, elasticity and fineness, by the dissolution of intercellular gum. The liquid will become turbid and colored from the discharged elements, and the fibre will come out, by rinsing, as lustrous and white as in its primary stage.

Such will not be the case with chloride of lime. The calcic

astringent will close the cells and allow the chlorine gas to operate only on the surface of the fibre. Hence, no discoloring, no discharge of the anigleous matters except from the loose outside portions of the fabric.

The question of superiority in quality is settled in favor of chlorozone. The question of economy will likewise be decided from the important improvements above mentioned. It is a matter of fair comparison between the two ingredients, especially when large purchase will permit a lower price in chlorozone. At present it is worth ten cents per pound, by single carboys, and eight cents by ten carboys at a time. Multiplied by forty times its volume in water, and simplified in the manipulations, the difference between it and chloride of lime cannot be of much consequence for manufacturers and bleachers animated by some spirit of progress and perfection regarding their trade.

Another important discovery recently made in relation to the improved chlorozone is that it acts as a mordant on goods which are not thoroughly washed after bleaching; also as a reagent and oxidizer on certain colors. This new feature, being now the object of a patent applied for, will be treated in a subsequent study.

Myrabolans.

This fruit, a product of India, often called Myrabolans, possesses tannin in a still greater proportion than sumac does. This tannin is to be found in the pulp which immediately encloses the stone. It is very variable in amount, the total weight of the myrabolan itself being from 20 to 300 grains—surely a wide difference. The moisture in these nuts after their importation is from three to seven per cent. The mineral matter, when the fruit is reduced to ashes, amounts to about ten per cent., and although the tannin principle is not as liberal in quantity as divi-divi, it has not that coloring matter which so greatly interferes with the usefulness of the latter. The most exact method of finding the true percentage of tannin in the sample is this: Grind the sample to a very fine powder. Fifty or one hundred grains are then weighed out and placed in a small beaker glass. Boil in a little distilled water for a few minutes, occasionally stirring with a glass rod. Without straining or filtering, pour off this liquid into a fresh beaker with another portion of distilled water poured upon the powder and boil afresh. Repeat this from four to six times, then pour all the decoctions together into the second beaker and set aside to cool, keeping them covered with a glass plate.

Preceding this, a standard test solution might be prepared thus: 1 drachm of dry, uncolored gelatine, dissolved in four fluid ounces of distilled water by a gentle heat. When dissolved, 15 grains of pure alum in fine powder is added and dissolved in the liquid and shaken occasionally. Then pour into a stoppered bottle, and preserve for use, in a dark place, at a temperature just sufficient to keep it from coagulating. 155 grains of this solution are sufficient for 5 grains of pure tannin. The ground myrabolans, if good, will be light in color, dry, free from a saline or intensely bitter taste. If slightly moistened or rubbed in the hand they should adhere very tenaciously to the skin. The ground myrabolans, in addition to the accidental impurities found in the unground nuts,

may be contaminated with finely-ground divi-divi, old and worthless sumac, or wild galls; to detect the presence of which, portions of the powder are scattered over a sheet of white paper, or a plate of glass, and examined with a lens. We can easily discern between myrabolans and divi-divi seeds, by the smoothness of the skin of the latter, and the pinched up or puckered appearance of the myrabolans. It is likewise easy to discern the difference between the leaf stalks of sumac from the torn or jagged fibre of the myrabolan nut.

The uses to which myrabolans might be applied are identical with those of any other tannin-giving product. The cheapness of this Indian plant, together with its superiority to galls and sumac, must at no distant day give it an advanced position in the dye market. In conjunction with preparations of iron it dyes cotton warps a fuller black than with sumac. It is likewise preferable for fastening aniline colors on cotton. The fact that as a mordant the oily and glutinous matter accompanies the tannin gives it a most decided advantage over sumac, the latter lacking such matter altogether. It is well to remark that the palest specimens are the best. They should be plump or but slightly shriveled, free alike from blackish stains or blotches and worm holes. When shaken together they should give forth a ringing sound. They should be hard, and when pounded in a mortar with a pestle they should break up into irregular fragments and light-colored dry powder. If they spread out into a paste under the pestle or crumble into a dark-colored dust between the fingers, they are good for nothing, or at least are of a very inferior quality.

To determine the proportion of stones to the pulp, it would be well to weigh 50 nuts taken fairly from the bulk, breaking up with the pestle in the mortar; after cleaning the stones of any pulp that might adhere to them, weigh them separately. The sample is all the better the smaller the relative weight.

Application of Chemistry to Textile Art and Dyeing.

(Continued from page 142.)

CARBON, C = 12.

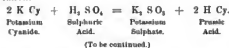
Carbon is a constituent of every organized substance, animal or vegetable, and is found in nature in three allotropic forms, which differ in appearance, color, hardness, etc., but chemically speaking, are nevertheless identical. These three forms are: 1st. Diamond; 2d. Graphite (plumbago, black lead); and 3d. The form it bears in coke, charcoal, soot, mineral coal, etc. In none of the latter forms do we have carbon in the pure state, lamp-black being the nearest approach to it. Pure carbon is a black, amorphous substance without taste or odor, infusible and insoluble in any known substance. It is not attacked by any known substance. It is not attacked by acids or alkalis, and burns in the air when heated sufficiently. It is used in the form of lamp-black as a pigment and is sometimes used for drabs and grays on cotton fabrics. The air being excluded, charcoal is obtained as a residue when organic substances are highly heated. Vegetable charcoal, under such circumstances is yielded from wood; and animal charcoal from bones (bone black). Charcoal possesses the property of absorbing gases to a large extent, and of removing coloring matters from solutions with which it is in contact; to which peculiarity it owes its application for disinfecting purposes, for the filtration of impure water, for the clarification of crude sugar, etc.

Coal is an impure form of carbon. Its composition varies considerably; carbon is the principle constituent, but it generally contains mineral substances which remain as ashes when the coal is burned; the other constituents are nitrogen, hydrogen, and oxygen. Coals which contain very little oxygen and hydrogen are called *anthracite*; those that contain a larger proportion are known as *bituminous coals*. Of no other element are we acquainted with that has so many compounds as of carbon. To the immense variety of substances composing the animal and vegetable world, all of which contain carbon, the labors of the chemist have added many more. Their study has brought out laws peculiar to them; and also a certain connection between them which renders it desirable to consider them together. These form the subject matter of "organic chemistry." A few of these compounds must however, be treated at this stage, on account of the compounds which form with the metals.

COMPOUNDS OF CARBON AND NITROGEN.

Carbon and nitrogen cannot be directly combined by any known method, but by indirect processes they can be united, thereby giving rise to a large class of substances known as cyanogen compounds, because their composition may be most readily explained by assuming in them the existence of a *radical cyanogen*, the symbol of which is C N, or more frequently abbreviated Cy. The term *radical* is used to designate a group of atoms, in this case of carbon and nitrogen, which acts as a unit, remaining together unchanged in a series of reactions, and in many ways behaving like a simple element. We are in fact, acquainted with this radical cyanogen, and can prepare it by heating mercury cyanide, Hg Cy. In this, as in all experiments with these substances, the utmost care and caution must be exercised on account of the insidious and dreadfully poisonous character of many of the substances. Cyanogen is a gas soluble in water, and burning with a purple flame.

Hydrocyanic Acid, (Prussic Acid) H C N or H Cy.—A dilute aqueous solution of this substance, which is a compound of cyanogen and hydrogen, may be obtained by treating potassium cyanide (cyanide of potassium) with dilute acids, dilute sulphuric acid being generally taken.



Dr. Muller-Jacob's Turkey-Red Mordant.

BY F. G.

There has been already considerable discussion whether the process of Dr. Muller-Jacob's, of Zurich (German patent, No. 1,488), for producing a mordant in lieu of the white mordant in turkey-red dyeing is really new, and consequently whether it is patentable under section 2 of the German patent laws.

Opinions differ widely, not merely on this question, but there is a disagreement as to what is protected by the patent above mentioned, i. e., whether or no the patent turkey-red mordant is identical with the turkey-red oil which has been introduced into the market from several quarters. A discussion of this question will probably not be out of place, and will doubtless interest the readers of this journal.

The turkey-red mordant patented by Dr. Muller-Jacob consists of a mixture of sulpho-ricinate of soda and sulphopropyterebate of soda; it also reserves the right to use, instead of the mixture just mentioned, a mixture of the sulpho-ricinate of soda, or ammonia, with a mixture of the sulphomargarate and sulpholeite of soda or

ammonia—the latter being obtained by treating olive oil with sulphuric acid. His turkey-red oil consists, therefore, of a mixture of different articles, on the ground that only such a mixture is useful, or that it at any rate gives the best results. The preparation, both of the sulpho-ricinate and of the sulpholeate and sulphomargarate of soda and ammonia, is not patented, and rightly so, since these compounds of the fatty oils and fats have not only been known for nearly fifty years, but they have been recommended and used in turkey-red dyeing as a substitute for the white mordants, as the following passage, taken verbatim from Dr. F. F. Runge's *Farbenchemie* (Tinctorial Chemistry), printed in 1834, will show. We read there, on page 213:

"The application of an oil treated with sulphuric acid, which for distinction I will call a sulphated oil, has advantages which the unmodified oil does not possess. With it a madder-red may be prepared, which approaches considerably to turkey-red, since it bears boiling in soap lye in a much higher degree than the ordinary madder-red, and that prepared with olive oil. It does not dye up quite as dark as that got up with olive oil, having a more yellowish tone, but after clearing with soap it looks the redder of the two.

"The preparation of the sulphated oil and the oil mordant are as follows:

2 lbs. Olive Oil,
1 lb. Sulphuric Acid,

are thoroughly mixed with a pestle in a stone mortar. The oil grows warm and blackens. When this has taken place, after an interval of about ten minutes, there is gradually added a solution of

2 lbs. Potash, in
1 gallon water.

The whole is stirred as long as effervescence takes place, and the oil collects as a yellow thickish mass on the surface of the water. The water is then drawn off beneath by means of a syphon, and the remaining oil is mixed, stirring constantly, with a clear caustic lye made of

2 lbs. Potash,
3 lbs. Lime,
1 gallon water.

"With this lye the oil forms a yellowish homogeneous milk, in which the cotton is steeped.

"The operation of oiling with this mixture is quite the same as with olive oil. The cotton, after it has been saturated with the oil mordant and gently pressed, is hung for some days in an airy place. It is then rinsed, dried, mordanted with the following aluminous mordant:

30 lbs. Alum,
30 lbs. Sugar of Lead,
8 gallons Water,

and is then washed and dyed.

"A second oiling gives finer colors, and the cotton even in this case has not a 'raggy' feel, as is the case after the ordinary turkey-red oiling. It is also free from smell.

"Treatment with galls or sumac, after oiling and before the aluminous mordant, is injurious to the color to be produced. Additions of cow dung, etc., to the mordant are useless."

It is a well-known fact that the turkey-red oil produced at present in a large number of chemical works is simply obtained by mixing fatty oils and fat with from 20 to 40 per cent. of concentrated sulphuric acid, more or less washing and neutralizing with alkali (carbonate or caustic), in short, by a process which agrees essentially with that laid down by Dr. Runge. It is also a fact that the turkey-

red oil obtained in this manner gives results at least as good as that of Müller-Jacobs. It is, lastly, a fact that the oil produced in the works arranged by Dr. Müller-Jacobs is not a mixture of equal volumes of the sulpho-ricinate of soda with the sulphoprotearate of soda, or of the sulpho-ricinate of soda or ammonia, with a mixture of the sulphomargarate and sulpholeate of soda or ammonia, but has a striking resemblance to impure sulpho-ricinate of ammonia. Indeed, whether Dr. Müller-Jacobs has ever prepared a turkey-red mordant on the large scale, according to his patented process, is more than questionable. It is at least certain that his method of manufacture, as described in his specification, has found no imitators, simply because an addition of the sulphoprotearate of soda does not improve the turkey-red oil, and the specified directions for its preparation are difficult and tedious. Hence, Dr. Müller-Jacobs's invention is reduced to the application of castor oil in place of olive oil, and this modification of Runge's process has been considered not patentable—whether by the inventor or the patent office is indifferent—for it has not been claimed.

The production of turkey-red oil from castor oil is easier than from olive oil, but the use of the sulphomargarate and sulpholeate of soda or ammonia in dyeing is on various grounds preferable to that of the sulpho-ricinate of soda or ammonia. Consequently, many makers of turkey-red oil now no longer use castor oil, but olive oil.—*Muster Zeitung für Faerberer.*

The Mordant Controversy.

It is always unpleasant to be obliged to interfere in a difference between two parties, each of whom we respect; and not considering ourselves as arbitrators, yet called upon to do a duty towards both, we desire to impartially present to our readers the two sides of the case, leaving its decision to others. However, in continuation of that which we have already given in our June number, we now present from our contemporary *Cotton*, the

STATEMENT FROM MR. BIRD:

Presuming on the courtesy generally accorded correspondence of interest, I venture to take up the gauntlet cast in my face by Mr. Slack, who is the second partner in the Leeds Company, and who no doubt is the man most responsible for the troubles that have arisen in reference to this mordant question, and who is now filled with rage at the prospect of his ill-gotten gains being materially cut short, just as I told them would be the case as soon as I found out the unjustifiable conduct they were pursuing, and time after time entreated them to alter their course by keeping up the standard and selling at one-half the price. As a proof of this, I now hold some yellow circulars they had printed at the time I am speaking of, some six months ago, in which the mordant is offered at 25 cents per pound (I think, however, they only had them printed to stay the pressure I was bringing to bear upon them).

However, I do not intend to indulge in any bitter or haphazard remarks, but confine myself to what is beyond question matters of fact, and for every statement I make let it be understood I have evidence to prove, and such evidence, Mr. Editor, is open to your inspection at any time.

By which it will appear that the remarks in the *Lawrence American* are very mild and showing a spirit of not wanting to kick an adversary when his ship is sinking.

I only there told some of their minor offences; now Mr. Slack, under the guise of the Leeds Company, has gone out of his way to open up other features of the question, in his communications in your columns.

To make the matter clear, I will, in as brief a space as possible, give a running history of the whole matter.

1. Mr. Slack says that some three or four years ago Mr. Bird, then in England, made overtures to the Leeds Company to sell his mordant. That is false, as Mr. Coleman, of Boston, came to me in England, saying he had heard such good reports of my mordant that he would like to have the agency, which I ultimately gave him. It was he appointed the Leeds as his sub-agents. All went on apparently well for some time, as I was shipping the raw materials for the mordant to Mr. Coleman's orders, and the Leeds sent me their checks for the same. When it was found to be a great success here, I was asked by them what I would sell my patent for. I replied £6,000. Some time after this, I had word not to make any more shipments until advised by them, as they claimed that they could find no sale for the mordant. The business appeared from that time to be at a standstill. It staggered me how a thing praised up as the greatest boon ever brought out for the dyers' use, could so suddenly fall into disfavor.

2. *Sale of patent for the States.*—After a time Mr. Coleman came to see me in England, and told me it was a fact that the mordant had no or next to no sales, and advised me to take a small sum for the patent, if the Leeds would buy it. The result was, I sold it for \$1,500, and as soon as I could arrange matters, I came out with a new and cheaper mordant, and, as an honorable man, gave them the refusal of it, either to purchase or to work on royalty. They were about four months hesitating over this, giving me time to spend all the ready money I had, so that they could then come in and drive a hard bargain. When they found I would not be put off any longer, they had proper tests made and found the mordant to contain 52 1-2 per cent. of tannin, as against 60 per cent. of the original. This, they said, would just suit them to run against other things in the market, as they could sell this by tons, while the other was too high to sell. The result was, I gave them the manufacture and sale for the United States and Canada, on a royalty of 1 1-2 cents per pound.

I then asked Mr. Jordan, the senior partner, what this would bring in. He asked for the books, and said they had been selling all along, he found, from two to three tons per month up to that time, and they could double or treble it with the new article. I said, "How comes it that I have been told by the firm and Mr. Coleman that the sales had died out, and only a few pounds were sold once and again, never exceeding 40 pounds?" as Slack had many times repeated the same over to me in the four months I had been kept waiting.

Mr. Jordan said, "That's a mistake; we have sold that all along."

I said, "Then you have been making independent of me from the time the sales were represented to have dropped off till you purchased the patent."

"Yes," he said, "that is so."

I said, "Then you owe me all that would have been my profits for that time."

He said, "That is so, and if you demand it we will pay it."

I of course did demand it, and obtained the money. Written documents of this I have for inspection.

3. They made no more sales of this new mordant than of the old, and when I complained they said, "Well we have never had a complaint against it, except that the price is too high." (They could sell at a profit at 25 cents, and I thought they did. Instead of that they were selling at 45 cents or upwards as I afterwards found). I therefore tried to meet what was represented as the requirements of the case by searching over the whole domain of every known thing that could be beneficially used as a good and cheap mordant.

When I had succeeded, I drew their attention to the matter, and, by appointment, met Slack with their superintendent, and in their own laboratory made such satisfactory results that they at once wanted to conclude arrangements for the sale of this the world over, declaring they could introduce it everywhere, and sell at least one ton of it per day. I believe they meant what they said and asked them to fix the price at which it should be sold. They said, "Leave that to us." I said, "That is not fair, as it can be sold at a profit at 18 cents per pound." They said they would sell it at that or any other price they could get, if it was only one cent per pound profit in large quantities, and in small lots at anything not to surpass 25 cents. They appeared to be so frank about it that I did not press to have it copied in the agreement, but did get them to print the yellow circular I have spoken previously about.

4. Trickery commenced as soon as the contract was signed, as follows: First, they kept the old price up, and in several cases, when I got orders at 25 cents and ten per cent. off, they would not fill them.

Second, they have not introduced it into any foreign country, or even Canada, although I hold a patent there.

Third, they adulterated it to the amount of three parts in nearly all cases; and now they dare, with brazen face, to deny it in the presence of the fact that I hold in my possession the documents to prove that in February last, that being the time I became aware of the adulteration, I pressed the matter so strongly upon them, that it was referred to their own solicitors who decided against them, and as a result I was awarded substantial damages, if I would condone the offence, with the pledged assurance of the Leeds that from that date they would send out nothing but the pure article.

I found they took advantage of the delay in signing this infringing business, to send off ten out of thirteen casks of the adulterated mordant they had in stock, which I had condemned, and within two months sent off the other three to the Pacific mills, for which violation of agreement, together with several other violations, I have caused a suit to be brought against them in the Superior Court.

Fourth, Mr. Slack tells a deliberate falsehood when he says I represented this as being superior to the first patent, as his own partner Mr. Jordan and their superintendent are bound to admit that I only represented it to contain 50 per cent. of tannin, as an aniline mordant, as against 60 per cent. of the first, and 52 1-2 per cent. of the second,

and so convinced were they of this fact, that before their chemist and both our solicitors, they were prepared to admit this as a fact. I offered to demonstrate before as many experts as they cared to bring. They did not care to accept the challenge. Slack speaks falsely when he says I promised to bring forward my chemist, as I need none, being chemist enough myself.

I said, "If it is taken into Court, I will then bring chemists as witness, if it is necessary."

I will answer some of the other points in the statements of the Leeds Company next week.

In my last I have spoken of analysis, and showed that my mordant would do the work of 50 per cent. of tannin, which was a different thing from warranting it to yield 50 per cent. pure tannin extract. That 38 per cent., as admitted, could be procured from it, is of itself a wonderful testimony to its value; as, had they sold this at 18 cents in small and 15 cents in large orders, it would have been a saving of over 300 per cent. as against pure tannin.

And to prove that they were in no way misled by me, I actually extracted the tannin from it at a cost of 32 cents per pound of the material (not including labor). These samples, I presume, they have in their possession now; and I am ready to repeat the operation again. Now the commercial price of tannin is from \$1.75 to \$2.00 per lb. So this would show a pretty good profit.

Mr. Slack said I had charged from 6 to 8 cents per lb. for it more than he could have bought it for. It must certainly be of tolerable good quality or it would not stand at 33 per cent., when more than half adulterated, from a stock of about 50 tons of the commonest stuff Mr. Slack could lay his hands on, and which was condemned by me as soon as I found it out, and I believe most of it is at this moment lying as dead stock in their storeroom.

So much for the article of the 12th. Now for the advertisement of the 19th, and for which Mr. Slack is, I believe, wholly responsible, as I think his partner would not have recommended it, and I should have been content to have allowed the simple vindication of myself to have passed as already published, but after that it would have been suicidal to have withheld the remaining facts.

1. Mr. Slack sits in judgment and condemns my present mordant. Most critics wait at least till they have either seen or heard of what they have to criticize. I have good reasons to believe that he has not even seen, much less tested it. If he has, so much the worse for him, as it is exactly what I claim for it, namely, about twice as strong as what they have been selling for about one-half the price; if it is not so I will forego my charge upon my sales proved to be otherwise. It does not at all resemble what they have been making.

2. Mr. Slack next refers people to the Washington office to see the patent and judge for themselves if it could be made for much less than what they have been selling it at. No one ever put their pen to paper to write a more misleading statement; as, ever since they obtained that patent by the fraudulent manner I have shown in my former letter, they have grudged making it pure, and I am open to prove beyond a doubt that they for three years have not made it otherwise than largely adulterated, and this was before they were my agents or I had any control over it; and no one knows it

better than Slack. When I first found it out, they told me they had sent it out pure and had it returned, so that they were obliged to adulterate it to meet the requirements of the market, and if I got my royalties why did I trouble?

3. Mr. Slack says they will now sell it pure for 18c. per pound, when he knows it could not be made for double that money. And to my knowledge they have got only a sample of it by them, and certainly have not made any of it. Since I left them, as I have had means of learning all that they have been doing, I do not indulge in any guesswork.

4. I know the ingredient that they intend to make from, if they ever get an order, as Slack told me so, in the presence of their solicitor, and instead of charging 18 cents, they ought to sell it at 10 cents, and then get a good profit, as I will engage to do it at that price.

5. They recommended the public to procure from one to five pounds of theirs and mine, and be convinced for themselves. That is the only suggestion he makes worth a thought. I thanked him for it, and only said, Yes, please do, and then test the bulk when you get it.

6. Mr. Slack says the original patent was the only genuine mordant in the world, and all others are spurious. O, judge! thou hast condemned thyself—for why didst thou turn from the genuine to the spurious?

7. Mr. Slack says they control all Bird's one-dip dyes and anilines. Of course the wish is father to the thought; but how comes it, if Bird's dyes are so spurious, that you cling so tenaciously to them?

This, however, I say most emphatically, the only thing they have any show of right to control is the first patent, and that I know they will not work, because of its costliness. All the other things were to have been cancelled at three different times, and, as I have never put an obstacle in the way of its being an accomplished fact, the fault is all their own. I think it shows what manner of men they are, when they seek to make a weapon of their own unfaithfulness to blacken my character, for by this very act they overthrow themselves—for their superintendent, who had been dissatisfied with their treatment for a long time past, when he saw the article in *Cotton*, came to me and said that after the outrageous misstatements contained therein, he could no longer hold a situation under them, especially if, as he believed, Slack's partner was going out of it. And with him they lose my formulas for manufacturing. Under contract they were to be delivered to the superintendent by me, to be worked as secrets; and, on his leaving, to be redelivered to me; and no one else can by the contract be employed for this purpose without my will and consent. So that Mr. Slack's indiscretion has produced the same effect as the cancelling of the agreements would have done, and entirely turned the scale, so that if they dare to use my name after this in connection with anything else than the first mordant patent (and that must be exactly according to the formula), they will be amenable to litigation, and I shall certainly watch the mordant they make (if any) to see that it is manufactured according to contract.

8. The untenable statement that they can always sell two cents lower than I can, when they have no idea what mine consists of,

I having made application to put it in a secret archives of the Patent Office, so that they or any one else cannot see it, much more tell what it is composed of, carries its own refutation with it, besides the fact that they never work except at a large profit.

In conclusion, I challenge Mr. Slack to show the least inconsistency in any of my statements, as for every one of them I can substantiate irrefutable evidence, while Slack's, as I have shown, are mostly wild and random misstatements. I am now content to await with patience the issue of the action I have brought against them for violation of agreement, damages and money owing me.

F. J. BIRD.

P. S.—I have shown Mr. Coleman my statement, and he is ready to take oath that, as far as it concerns his part of the affair with the Leeds Company and myself, it is perfectly correct, and that the statements he made to me were given to him by Mr. Slack before he came to me in England to get me to sell the patent; and so thoroughly did he believe Slack, that he was induced for a small consideration to be bought out. He looks upon the whole business as a downright swindle on Slack's part.

STATEMENT FROM LEEDS MANUFACTURING COMPANY.

NEW YORK June 30, 1880.

To the Editor of Cotton:

In reply to Bird's statement in your last week's issue, we wish to emphatically state that the bulk of his article is false.

We don't wish to continue this controversy any longer, but simply say "the proof of the pudding is in the eating." Matters are now in progress to settle these charges in a court of justice and if truth conquers, Bird will have to spread his wings and fly to a more congenial climate. We have proofs that Bird is little aware of. Let him remember that those who crow last, crow the longest.

LEEDS MANUFACTURING COMPANY.

The Soluble Glass and its Application in Industrial Purposes.

BY FR. BRAUSE, JR.

In the seventeenth century it was already known that a combination of silicic acid with much alkali had the property of dissolving when coming in contact with the air. It was preserved through melting of silicious sandstone with a surplus of alkali, and the smelting or melting was named liquor of flints, or liquor of quartz. In the beginning of this century Professor Fuchs established for the first time this kind of combination, in which the silicic acid predominated, which, however, dissolved in water, but did not dissolve at all in the air. He named this combination *soluble glass*; it is distinguished through not being in the dry condition of common glass. By the analysis both show different combination, because the glass contains, besides the alkali combination of the silicic acid, less quantities of combinations of the last with metallic and alkaline salts, which proves its insolubility. Four kinds of soluble glass are distinguished:

1. Potassium soluble glass.
2. Sodium soluble glass.
3. Double soluble glass.
4. Fixing soluble glass.

The first is the potassium combination of the silicic acid, which is prepared by dissolving 45 parts of quartz powder, 30 parts of potash, and 3 parts of charcoal powder. The last serves to accelerate the

liquefaction and to reduce the liberated carbonic acid of the potash to the purpose of the most perfect expulsion of carbonic oxide, because a retention of carbonic acid is highly detrimental to the soluble glass. The sodium combination is established, instead as above, with potash, by dissolving carbonate of soda with quartz powder, precisely in the following proportion: 45 parts of quartz powder, 23 parts of calcined carbonate of soda, and 3 parts of charcoal.

Instead of the dear soda the cheaper Glaubersalt, or even common salt, is employed. A direction how to produce it by means of Glaubersalt is: Melt 100 parts of quartz powder with 60 parts of Glaubersalt, and 15 to 20 parts of charcoal powder.

In its manufacture it is decomposed by means of common salt under a high temperature, and the presence of steam by silicic acid in soluble glass and muriatic acid.

Also, with the third passage may be produced soda soluble glass, because silicic acid is in a state of amorphism; for instance, quartz pulverized and treated with concentrated soda lye, under a pressure of 7-8 atmosphere. According to Liebig, the infusorial earth (Tripoli) is particularly fitted for this, as it almost entirely consists of pure silicic acid. It is annealed in order to expel completely all organic remains, and is then dissolved in soda lye. After dissolving there remains only a small residue of sand, sesquioxide of iron, and limestone.

The double soluble glass consists of potassium and sodium soluble glass, and is reproduced like the others, because to the quartz powder is added corresponding quantities of carbonate of soda and potash liquefied. It is further represented through the liquefying of: 1. Potassium sodium tartrate with quartz. 2. Potassium and sodium nitre (saltpetre) with quartz. 3. Tartar and sodium nitre with quartz.

For technical purposes also a mixture of: 3 parts of potassium soluble glass solution with 2 parts of sodium soluble glass solution.

As to fixing soluble glass, take a mixture of silicic acid with a complete saturated soda soluble glass with sodium siliceous moisture. The last is obtained through dissolving of 3 parts of calcined carbonate of soda and 2 parts of quartz.

The discovery of soluble glass was an important progress for science and industry in many respects. Its first application was as a preventative of danger of fire, because it was found that stuffs steeped in it could not blaze up, but carbonized a little. This property was made use of, because to a soluble glass solution was added a durable body-color, proof against fire, which gave the coated objects various colors. The first tint is made with thin soluble glass in solution; the last with a stronger solution. Treated in this manner, stuffs, such as wood, canvas, linen, paper, etc., not only offer a considerable resistance against the flames, but receive greater adhesiveness. Wood, which is exposed to the influence of the weather, or found on damp, muddy places, is preserved by this soluble glass coating, and is also secured against fungus and being wormed.

A further application of the soluble glass is its aptness to bind and to glue. Thus, for instance, the soluble glass unites itself with chalk in a compact mass, which in time becomes as hard as marble. It likewise unites with ground bone. With slacked limestone soluble glass unites very easily, drying up into a tolerably hard mass.

Again, the soluble glass unites very energetically with oxide of zinc and magnesia. Gypsum, with soluble glass, gives silicic acid lime, which, however, in drying up does not become harder than the common gypsum, for which reason soluble glass cannot be used in the impregnation of objects from gypsum for the purpose of greater solidity. The adherence of soluble glass to salts of lime was lately made use of with respect to the production of artificial stone; as the

first is mixed with sand to a plastic paste, pressed and dried in moulds. The moulded pieces are then brought into a solution of chloride of calcium to unite the last with the dry solution of soluble glass by means of silicic acid lime, and in this manner cement together the sand to form a durable, compact mass. According to this method, various objects, such as stone troughs, sewers, sinks, curbstones, and even vari-colored sidewalks and floor-plates are neatly executed.

But not alone to such purpose does the soluble glass find application. It is also useful in the coloring art, as well as in relation to painting and to dyeing.

Concerning painting, the soluble glass is used on wall and monument painting, in order to give the wall-plaster a uniform, stone-like appearance, being silicified and incorporated with the wall. Upon that kind of wall-plaster, after it has been smoothly rubbed off, the paintings in water-colors are put on and fastened, after drying, by varnishing it with soluble glass. If the colors are well fixed the painting is then ready, and requires only to be rubbed off, after a few days, with alcohol, to remove the dust and excess of alkali. In such painting care must be taken to apply only such colors as combination with soluble glass will not change.

Reproduced paintings resist almost all exterior influences, such as smoke, acid fumes, sudden changes of temperature, hail and the like, because the color base is, as it were, blended with the colors, and are therefore far preferable to the wall paintings produced in the customary way.

In dyeing, the soluble glass is principally employed in the anilines, and very recently, also in turkey red. The siliculous soil is precipitated either through a previous mordant upon the fibre, or even by being separated in the bath. When the color in simple solution does not dye, the evil is remedied by the siliculous soil upon the fibres. The process of coloring is by the direct colored stuffs, through a species of filtration, because the yarns and webs to be colored are generated by the coloring fluid, whereby the small color particles therein present settle upon the fibre, while the fluid finally runs off clear. Naturally the color material must be so soluble that no precipitate can form itself when the dyer's bath is left standing, for as soon as this happens the single parts become too voluminous to penetrate the interior of the fibre and they therefore remain upon their surfaces, whereby spuriousness and dirt are caused.

But if the color materials are so soluble that by a concentrated solution the fluid appears somewhat colored but almost transparent, the color material does not then cling to the fibres, but is rinsed out again with the flowing off of the fluid, except the few colors which come in a direct combination with the fibres. If to these color materials be added soluble glass, condensing the bath and separating themselves through partial combination with the dyeing stuff in the finest distribution, then is the evil obviated and the dye acts exactly upon the fibres as it does by the lesser soluble stuffs. A subsequent passing through an acid bath completely separates the siliculous earth and effects a durable blending of the color with the fibres, together with a simultaneous cleaning of the first. The agreeable dyeing stuffs are principally alkali (blues), iodine (greens), and others.

Finally, there remains yet to mention the applying of the soluble glass in the establishment for washing wool.

It is made use of by part alone in thinned solution, part in union with carbonate of soda, and renders here essential service through its dissolving of fat and filth.

The goodness of the soluble glass depends upon the intrinsic

worth of the silicic acid. The more silicic acid the soluble glass contains, the more efficacious is it in use, because in all cases the silicic acid is the efficient constituent part of the soluble glass.

Picric Acid and Its Adulterations.

Trinitrophenol, usually called picric acid, is a beautiful yellow dye much used in silk dyeing, and is, of course, often adulterated to enable the manufacturer to cheapen it.

Picric acid is slightly soluble in cold water, more so in hot water, and very soluble in alcohol. It melts at 122.5° C (252° F.). If carefully sublimed it leaves no residue. The most common adulterations are: Oxalic acid resinous substances, saltpeter, niter, and Glauber salts.

The presence of oxalic acid in small quantities cannot be looked upon as an adulteration, because when picric acid is made by the action of nitric acid upon phenol, indigo, or the resin *Xanthorrhoea horticola*, more or less oxalic acid is always found by the oxidation going too far. In crystalline form the white prismatic oxalic acid crystals are easily distinguished under the microscope from the brilliant yellow scales of picric acid. If it is in a powder, a solution is made, ammonia added, and then chloride of calcium. A white precipitate indicates oxalic acid.

Resinous substances are not directly and intentionally adulterations, as they are often present when the preparation is not very exact and careful, but they are injurious in dyeing, and the consumer must take the following precaution: The picric acid is dissolved in hot water and 1 part of chemically pure sulphuric acid added for every 2,000 parts of picric acid, stirring until completely dissolved. If resin is present it will separate; it is then filtered and sulphuric acid again added, which precipitates the last trace of resin. After a second filtration it is perfectly pure, and may either be used in solution or left to crystallize out. By this method Winkler found from 0.01 to 0.03 per cent. of resin in different kinds of picric acid.

Potash and saltpeter are detected in different ways. First, by the microscope; secondly, by the blue cobalt glass: potash salts imparting a violet color to the colorless flame, soda a yellow. The third and best test is to put the picric acid in a test tube and add absolute alcohol. On shaking and slightly warming, the picric acid dissolves, but saltpeter does not.

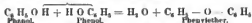
Glauber salt is easily detected in the same manner as any other sulphate. The picric acid is dissolved in warm water, some chemically pure hydrochloric acid added, and then a solution of chloride of barium. A white precipitate of sulphate of barium shows the presence of a sulphate, probably the sulphate of soda, Glauber salt.

The above tests, by Dr. Knetzer, are so simple that every dyer can repeat them for himself.

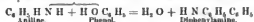
A VERY interesting reaction of vanadium has been communicated by Prof. Roscoe. If a solution containing vanadic acid in boiling sulphuric acid is diluted with 50 times its weight of water, a dark red liquid is obtained, which, when treated with zinc, passes all the shades of blue or green till it remains of a violet hue. The vanadium is found in the solution as sulphate of the lowest oxide, and this compound absorbs oxygen with such avidity that it reduces indigo and other vegetable matters with great rapidity.

A VERY important discovery, made by Merz and Weith, the two distinguished chemists, professors at the University at Zurich, may lead some day to more progress in the manufacture of coloring matters. It is well known that diphenylamine is the starting point of

blue and other colors, and therefore manufactured on a pretty large scale by the reaction of aniline upon its hydrochlorate, when ammonia is produced as by product, and diphenylamine is formed. As, however, the operation is done under strong pressure, and the yield is not satisfactory, so a method facilitating the manufacture of this amine will certainly be a great boon for the industry of colors. The learned professors found previously that by heating phenol with zinc chloride that phenylether was formed thus—



The same reaction can be applied to the amines, and even to ammonia itself; thus, if phenol and aniline zinc chlorides are heated together, diphenylamine is formed in considerable quantities—



As no pressure is required, this is the easiest method of obtaining diphenylamine. Aniline itself can be obtained, following the same reaction, by treating phenol with ammonia zinc chloride. This discovery will no doubt be found capable of more useful application.

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Continues on in its career of usefulness.

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Comes regularly to our table, and is always welcome.

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We duly receive this useful and well-edited journal.

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Always fresh and invariably reliable is this scientific serial.

FÄRBER ZEITUNG. M. Reimann, Berlin.

Gives fresh and useful information, and is always desirable.

LES TISSUS. Paris and London.

Presents a variety of designs with full instructions,—very suggestive and useful.

MUSTER ZEITUNG. Berlin.

Maintains its position as a useful chronicle of what is going on in the textile world.

LE PANTHEON DE L'INDUSTRIE. Paris.

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LE TEXTILE DE LYON. Lyons and Paris.

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Has most deservedly met with exceptional success, inasmuch that it has to issue two distinct publications to meet the demands on its advertising space. Both issues are showy, terse, witty, and instructive.

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THE CHICAGO JOURNAL OF COMMERCE.

Is one of those Western publications which lay before us the wondrous commercial growth and activity of the home industries of the great city from which it issues. It is truly a trade newspaper, and a good one in all respects.

THE NEW YORK SCIENTIFIC AMERICAN and its auxiliary, the **SUPPLEMENT.**

Are publications which cannot well be surpassed for utility of information. Most artistically illustrated. These are positive authorities, to which scientific questions can safely be referred.

THE DRYGOODS BULLETIN. New York.

This useful publication, which is now far advanced in its eighth volume, adds to its claims on public favor by giving a portrait in each number, of some prominent drygoods man, together with a biography. This is (as poor human nature goes) a taking feature; that is if the respective features are fairly taken. But apart from this portraiture we look upon the *Bulletin* as a really good weekly publication, and well worthy of the patronage it receives.

COTTON.

This new-born journal comes regularly to us with a full amount of useful information on all subjects interesting alike to manufacturers and planters. There was an opening for just such a journal, and that opening is now well filled.

BOSTON JOURNAL OF COMMERCE.

As usual, its columns are replete with information, reliable, select and useful to all industries.

WOOL AND HALF WOOL PIERCE DYEING, COMPLETE IN ALL ITS BRANCHES. By H. Pruefer, Technical Chemist and Dyeing Director. Illustrated with wood cuts and 164 dyed samples. Published by Gustave Weigel. Leipzig.

This is a ready and desirable book of reference for the practical dyer. It contains very many good and useful rules by which the difficult problems, which so often occur, may be solved. The author is a thorough chemist, whose analytical and practical knowledge makes a perfectly reliable guide. This book has not been translated into English, so that it can only be had in its German form. The numerous dyed examples are a great feature in this useful book. Price, \$9. May be had at this office.

WANTS.

Manufacturers desiring help in any department, or persons seeking employment, can have their wants advertised in this column for the low rate of 50 cents per line. No other advertisements will be admissible in this department.

WANTED.—A situation, by a first-class practical piece dyer on fancy manures, worsted, broadcloth, hosiery, etc.; also on fancy branches. Has thorough knowledge of blue dyeing, both on wood rats, jacks vats, and patent indigo. Best of references. Address, R. F. Case of TEXTILE COLORIST, 306 Arch St., Philadelphia, Pa.

WANTED.—A first-class dyer will be open to an engagement on the first of August. Thoroughly understands the dyeing of cotton and wool and woollen pieces. First-class references. Address, F. H. Case of TEXTILE COLORIST, 306 Arch St., Philadelphia, Pa.

WANTED.—A practical designer of 25 years' experience in all branches is open to an engagement. Address M. F. Case of American Textile Manufacturer, 306 Arch Street, Philadelphia.

TEXTILE COLORIST.

Entered according to Act of Congress, in the year 1880, by DR. M. FRANK, in the Office of the Librarian of Congress at Washington, D. C.

Vol. 2.

Philadelphia, August, 1880.

No. 20.

On Calico Printing.

BY DR. M. HARENCKLEYER.

(Continued from page 146.)

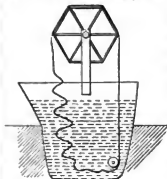
The quantity of madder to be used for one piece, varies according to the shade which is wanted, from one to seven pounds. The whole amount of madder for a number of pieces, which shall be dyed in one bath, is put in as little water as possible. It certainly must be enough water to allow a proper circulation of the cloth, but no more. In some cases, where very heavy colors are required, some dyers make it a double operation, because the water might be evaporated or absorbed before the process can be finished; although a second dyeing is not in very extensive use, it gives good results, and the process is more certain.

When the madder has been put into the water, the mixture is quickly heated up by steam to 120° F., then the cloth is put in and the temperature gradually raised up to the needed point. Dyers generally think it very important to have a regular heat, not allowing the dye-bath to cool off while in operation; they would call it the cause of an uneven and unsatisfactory result.

The temperature to which the bath can be raised, varies in different establishments from 170° to 200°. Some of the principal dyers think it not very good to have the bath more than up to 170°; they say the madder itself changes if the heat is put higher than 170° or 180°. Some colors, if they are dyed separately and no other color in the pattern, may stand a heat higher than 180°. Garancine black and chocolate may be heated up to 200° without undergoing a change, but it is always wise not to use a higher temperature than 170° until at the end of the process, when a heating up to 200° or even to the boiling point cannot do any more harm. A great difference of opinion exists in the time of dyeing; many works dye their pieces for as much as two hours, while others call it sufficient to operate only seventy minutes. It must be left to the various establishments; all of them claim, and most of them really have good results, and it should therefore seem the best to choose the quickest method; but although all the dyers know that it is possible to finish in less than two hours, many of them keep this time up.

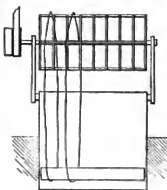
The dyeing apparatus consists of a peculiarly shaped vessel, built half underground, and stands about 4 feet above. Over the whole length of this apparatus a frame is arranged to roll the pieces into the solution and out again. Every piece is fastened together at both ends after having been hung over the frame and in the bath in the proper condition, and is therefore able to run over the frame out of the solution, and in again on the other side continually, as long as the frame is in motion. The longer the apparatus and the frame, which always reaches from one end to the other, are built, the more pieces can be dyed at one time. The usual quantity of

pieces dyed in one bath is twenty, but there can be more put on the frame if the size allows it. During the time of dyeing, the foreman has to take out occasionally some parts of the cloth and rinse them out, in order to see if the work is going on well, or if by some mistake a good result is doubtful. With a little care there is not much danger of spoiling pieces during the dyeing process. When the dyeing is completed, the pieces are taken from the frame and brought out in wagons for further treatment.



The Clearing.—By this process, those parts of the printed and dyed goods, which have not obtained any color, but left white, according to the design, are made as clear as possible, and it depends much on the care in this process, whether the goods obtain a

good appearance or not. Those white places although no mordant has been printed on, have taken up a small quantity of coloring matter, which give it a dirty yellow or brownish appearance, and to remove this coloring matter is the object of this process.



The pieces are first brought into a washing machine, similarly constructed, as mentioned before, where it is allowed to run for some time through water, in order to remove as much color as possible, which was left in the fibre mechanically, and it should not be taken out until the water, which is pressed out of the cloth, runs off entirely clear and colorless. After this the pieces are passed through a bath of bran, scalded in water at 130° F. The colors are said to obtain a brighter appearance by this process. Some dyers used to add the bran to the dye-bath, which would bring forth a brighter color but probably not so deep as without adding the bran. It is not much used at present. The pieces are now subjected to another bleaching process; the bleaching liquor which is used for this purpose must be very dilute. The pieces are passed through this liquor until the white places are sufficiently clear, they then are brought farther for soaping. Some dyers have the soaping done before bleaching; it will probably be the same. The soaping is very important as it improves the colors very much, it makes them brighter, and many say, also faster. As to the kind of soap to be used, the opinions of dyers

are also different from each other, but all agree, that the better the soap is, the better the result will be. Some use soap which contains rosin, others do not think it good, but it is sure, that a soap which contains rosin never will give better results than such without rosin which only contain fat, alkali and water. A good finished palm oil soap with some free alkali is preferred by many large works, and it will always give the color a good and favorable appearance. Too much free alkali of course must be avoided, as it would injure the delicate colors.

The object of soaping is first to remove some coloring matter which has been left in during the former treatments, and then to clear the white places perfectly. There are several soapings necessary to obtain good colors; the manufacturer uses at least three, but some go up to six. It is done in an apparatus similar to the dye-bath, where the cloth is passed in the boiling or nearly boiling soap solution. This will take some of the color off, but the dyeing has to be arranged that the desired strength of the color will be obtained after soaping. The soap water has to be changed often to avoid the dirt which comes from one piece to settle on another afterwards. Many other substances have been tried to be used instead of soap, carbonates, boraxes, phosphates, caustic alkalis, etc., but none of these will answer as well—they will injure the color more or less. Many dyers use a weak sour bath between the different soapings, which has shown to be a marked improvement on the colors; they take some parts of the reddish tint off and leave a more bluish shade which is generally preferred.

Another important madder color is the pink, which in its several processes is obtained similar to the purple. The mordant for this color is generally acetate of alumina, but there are several other substances used in different works; some use a mixture of acetate and nitrate of alumina and claim good results. Whatever mordant is employed, it is very important to have it entirely free from iron, as the smallest trace of it will effect the color and injure it.

The mordant is suitably thickened with gum water and printed on the cloth as directed. During the ageing it is important to have the pieces hang in the room long enough to soften the color thoroughly, and to have the air very well moistened. The pieces are then passed through a bath of sal ammoniac and then well washed. Arcenate and silicate of soda are often used with the ammonia salt, but it has not yet been shown to be an improvement.

The dyeing is the same as with the purple. The soaping however requires more care and must be done often than with purple. The temperature should not be more than 140° F. With the soaping generally the souring is combined; the souring gives the color the real shade. After dyeing the color looks similar to a crimson, and by passing it through a sour solution it gets "cut" and the color changes. From the many acids and acid solutions, which have been tried for this purpose, oxymuriate of tin has proved to be the best. The quantity of the oxymuriate which has to be taken for souring, depends on the desired shade, and must be left to the dyer.

For the finer shades especially, the sourings are always followed by soapings, and as many soapings as many soapings. The last oper-

ation must be a boiling in soap, the solution containing a good quantity of soap. For a good and very bright shade some tin crystals are often added to the last boiling.

(To be continued.)

Remarks on Logwood.

FRAUDS AND THEIR DETECTION.

On the coasts of Honduras and Campeachy Bays, as also in Jamaica, San Domingo, and some other of the Antilles, may be found some of the most important of the dye-woods, which in that region are most abundant. The *Hæmatoxylon Campechiense* affords an abundant supply of logwood, that which grows at Campeachy being preferred.

Logwood gives forth a very large proportion of dyeing matter, the nature and power of which has given rise to a good deal of discussion, some holding that there exists in logwood but one coloring principle named *hæmatoxyline*, sometimes incorrectly termed *hæmatin*. To this principle is assigned the following principle: It forms clear brownish-yellow crystals slightly soluble in cold water, but very readily in boiling water. This aqueous solution if very dilute, is reddened by nitric acid; if this acid be concentrated then the color is destroyed. Baryta water and solutions of carbonate of potash and soda give very pale blue precipitates which pass through red into brown. Alum and chloride of tin give red precipitates. By the joint action of ammonia and air, this hæmatoxylin is converted into hæmatin, a pulverulent body with a dark green metallic lustre, soluble in water with a brownish-red color, and forming red solutions with dilute acids, and a violet liquid with ammonia. Rouge, on the contrary, finds in logwood three distinct pre-existing colors, which he names respectively "logwood-purple, logwood siskin violet, and logwood violet."

Decoction of logwood recently made is of a yellowish-red, which becomes redder if concentrated. It becomes a brighter and more transparent red under the influence of acids. It is turned blackish blue by salts of iron in solution. Again it is turned a splendid rose purple by hydrated oxide of antimony. Chloride of zinc throws down a dull purple precipitate, leaving the liquor perfectly colorless. It is blackened when heated with chromate of potash, either neutral or acid. In the cold this change just mentioned takes place also, but more gradually. The acetates of lead give blueish precipitates, the sub-acetates leaving the liquor nearly colorless.

The tinctural or coloring principles of logwood are not very abundantly soluble in water, but it makes a difference as to the temperature of the water, for instance: boiling water takes up 21 per cent., whilst cold water takes up but 1 per cent. of color. Afterwards this decoction can be concentrated to any required strength. During this process a certain amount of tarry matter becomes separated, and can, if required, be brought to a state of solidity. These decoctions are called *extract of logwood* and *logwood liquor*. The coloring principles of the wood are found in the cold infusion in an altered state; in the decoctions they are more or less modified, according to the heat they have undergone, the length of time it has been applied, and the greater or less access of air during the process.

It is not an uncommon idea that the coloring matter of logwood is, in good part, generated by air and moisture conjointly; but it is far more probable that the gradual absorption of the water swells as well as softens the woody fiber and leaves the coloring matter easier of extraction. A hundred grains of rasped logwood when fully dried will lose from 44 to 48 per cent.

There are many frauds connected with the sale of logwood, some of which are worthy of mention here. The ground wood is sometimes sprinkled with sturine, with lime-water, or with a weak solution of soda ash. These alkalies are sure to give a brightness and bloom to the ground wood, thus passing it off for a superior article; the action of these liquors causing it to bleed more freely, either in cold or hot water, but their action is likewise injurious to the color impairing its strength of tone. This is easily proved by putting five grains of rasped logwood equally into two glasses and pouring on each, two ounces of clear pure water; add to one of them a drop of ammonia. It will be found that the alum will extract the color in this glass more rapidly, but that it will result in a dirty brown earthy color.

It is very desirable to detect these frauds, and indeed it is not very difficult; in fact, quite the contrary. To find the amount of moisture, weigh out a portion, then expose it to a heat of 212° F., and weigh again; the difference will be the amount of moisture contained in the wood. Should this moisture exceed 43 per cent, and not have been coarsely rasped, it will be capable of being molded into a compact ball. But if it should be, or exceed 48 per cent., then a few drops of water may be squeezed out of a handful, and the squeezed mass when thrown down will fall in lumps.

Neither is it at all difficult to discover the presence of alkalies. The following is a very simple plan: Steep a small portion of the wood for a short time in cold water (distilled) then float a small scrap of delicate red litmus paper upon its surface. In case any alkali should be present, a blue stain will be clearly observable on the upper surface of the litmus paper before its color can be in the least affected by the logwood liquor.

The comparisons of samples of logwood are best made in the dry state; those on which the greatest number of moist stains and particles of greenish bronze are perceptible on the surface are the best. A large display of black particles, the gruffs or gripps arising from the dark and porous outside wood, is not desirable. Should still greater accuracy be deemed requisite, take equal weights of the samples, say five grains of each, and place in five clear white glass phials or tubes, all equal in calibre and size. On each of these pour one ounce measure of methylated spirit, or of extracting liquor, and allow the phials to stand for an hour with occasional shaking; comparing the five phials, it is easily discerned which has the brightest and strongest color. Critical inspection may likewise be judiciously applied to extract or liquor of logwood, 8°, 10°, or 12°, T, though for the use of fancy leather stainers it is prepared at even 24° strength. In some parts of Europe as well as in this country, there is a dry solid extract in the market, which is formed by rapidly evaporating the liquid article, and this is the kind intended in foreign recipes for dyeing and printing. The solid extract, when preserved from damp loses nothing by keeping, and can readily be

dissolved to any requisite strength. The air, however, when in contact with it, invariably deteriorates the colors obtained from this solid extract, and are very much duller than those obtained directly from the wood, or from a liquid extract of low strength. Paste extracts are also found to be very useful in printing.

The indications of Twaddle's thermometer are not to be at all times relied upon in the investigations of liquid extracts, because these liquors are frequently "sprung" (to use a technical term) with common salt, which raises the Twaddle, whilst it detracts from rather than adds value to the article. For the certain detection of this fraud the following will be found to be a very effective plan: Place a small quantity of the extract in a glass tube and boil it with a few drops of pure nitric acid until the color is completely destroyed. Then dilute with pure water, together with a few drops, in solution, of nitrate of silver. Should it happen that salt is present, there will be formed a dense white curdy precipitate, which, on the application of heat, will subside to the bottom of the vessel.

All these solid and paste extracts here spoken of may possibly not only contain salt, which can be detected as we have shown, but likewise farina and extracts of chestnut bark. The value of such samples may be had by comparison, which may be ascertained in the following manner, viz.: By placing equal weights in phials or tubes and adding equal parts of methylated spirit as before directed.

Logwood is used in different states for various purposes. When the goods are smooth, for piece dyeing, that is, when they are not adhesive-like stuffs, the rasped wood is employed. For printing, the extract is preferred, as also for dying wood and slubbings which could not be perfectly cleaned from the particles of wood by rinsing. Chipped wood very often comes into requisition for soft piece goods on account of its nappy surface to which the raspings would adhere, —although here too the extract is found to work cleaner.

The chief use to which logwood is turned in the dyeing of textiles is that of dyeing black with the aid of chrome of iron. Nor this alone, for it often yields blues rather closely imitating indigo blues in shade, although quite inferior to indigo blue in permanency. Logwood also enters into many browns, drabs, greys, slates, chocolates, lilacs, and some other useful colors in dyeing.

Suggestions on Feather Dyeing.

(Continued from page 169.)

We have stated in our preceding issue that the white scale is produced by combinations of blue, violet, yellow, black, etc. The method of dyeing this required white with these materials, depends greatly on the feather, whether it be tender or hard. And here we may remark that great caution should be observed when opening the feathers in the bath, so that the first feather shall lie snugly among the others. Supposing that the white obtained happens to have too bluish a tint, or too pinkish, or again, that it does not match the pattern color. If it should prove to be too blue, then it will be necessary to bathe the feathers in pure cold water, (or it might be luke warm if desirable) so that the blue shade being reduced a little will thus correct the fault. But it must be evident that a good dye should not be subject to such a requirement, for it cannot be either fresh or permanent. Undoubtedly the best thing

to be done when the pattern is difficult or say impossible to match, is to pass the feather through water more or less, impregnated with carbonate of soda, warm it a little, and then rinse and place in a hot bath of sorrel salt; soap should not be used save in an actual case of necessity.

Faded Colors.—It is apparent with the free colors already spoken of, that for any given shade or tint, we employ two coloring materials which are each pure in itself—that is to say except from black. We have seen the aniline colors playing a prominent part on account of their possessing a great amount of purity and brilliancy.

• On the other hand, when feathers have to be dyed any dull color, recourse is had to the old style of coloring materials such as sorrel salt, ludigo, carmine, curcuma, etc. For a clear color faded, such as grey, aniline coloring materials can be used with advantage. But should a darker color be required, having some body, then others must be employed, probably on account of the natural coloring material being less pure than the artificial; that is to say, deeper and richer in the radiations of the different colors. The same results will be obtained with a mixture of aniline colors; but, at the same time it must be observed that they do not blend so well on feathers, and after rapidly saturating itself the feather will not take any more color.

The dye of dark garnet has been already described. Chocolate, Havana tobacco, etc., are shades very difficult to take, as are also those in wood, such as mahogany, cinnamon, etc. To define them it may be said that to mix them, a color is formed more or less mingled with black, and like orange, is more or less red, so that one or other of the colors spoken of is obtained. In order then to tint a feather with these colors, materials must be used which fade reciprocally, but not in such proportion as those which make chestnut. For example, to obtain a chocolate color, a black bath may be used, reduced with acid. The juice of sorrel salt from violet acid. In decomposing the black bath with it, the logwood acid is set at liberty, and the feather takes a dull yellowish tint. Then by the juice of sorrel, in a very small quantity, a slightly red shade is given, and by the violet acid the desired degree of dark shade is acquired. In another case, to obtain Havana, black reduced by acid is used, some grey pink, and some sorrel salt.

It is here proper to remark, that the use of a black bath decomposed by acid, presents two serious obstacles. It is at first rather difficult to obtain a perfect equality by nature of the coloring materials, which are in a state of suspension in large grains. Then the color obtained changes after a certain time if exposed to the air; even the black regenerates on the feather. Consequently it is better for the formation of these colors to use aniline brown (*Bismark*) which can be made pale with grey yellow, or grey pink, according to the shade. If needed a little violet acid can be added. If the shade is not pink enough the pur-salt of sorrel, or a solution of rosaniline is admissible.

However, Bismark brown has this defect for certain feathers: It is apt to settle strongly on prominent parts, rendering them too red. It is therefore necessary to use it with great caution when needed for this class of feathers which in general have prominent

features. When an accident like this takes place, the feather must be taken out immediately from the bath, rinsed at once and rapidly soaped, twice or thrice. After rinsing, the feather must be dyed by a process already described. Yet, in spite of all this care there will remain feathers which are redder at the head than the others. To obtain the indicated shades one can use extract of chestnut, grey pink, juice of sorrel salt, and, if required, some curcuma. The extract of chestnut should be used in sufficient solutions of proper duration and in small proportions at a time. The manner of operating in the different processes described is always the same. The bath should be more or less warm according to the degree of hardness of the feather to be operated on. Sulphuric acid is better than sorrel salt. The coloring materials are poured on first which gives depth to the color, and it is shaded afterwards.

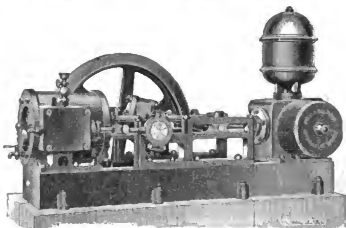
Gum Mastic.—The color of gum mastic is a very pale yellow, dull, and slightly pink. The best way to obtain this color is from the extract of chestnut, which although used alone can strictly give the desired shade. It is used in an acidulated bath of sulphuric acid or sorrel salt, rather warm. The extract should be naturally prolonged in solution and very limited.

If the pattern is greyer than the tint thus obtained, violet acid and extract of chestnut should be used. To make it pink, cochineal should be used in preference to sorrel salt. On the other hand, to make it yellow, pieric acid, or curcuma may be added, according to the shade. At other times to produce a sufficiently strong green, it will be judicious to have a trace of indigo or carmine spread out in a large quantity of water.

(To be continued.)

Combined Balance Wheel Steam-Pump and Steam-Engine.

Where economy of space, facility of management and reduction of expense are objects to be desired, the combination of which the accompanying engraving is an illustration, appears to offer decisive testimony of its value in these respects.



The combination of the steam-engine and pump is one that can be very easily disconnected; in fact the removal of the key from the cross-head will at once detach the pump from the steam-engine, thus rendering the latter completely independent and free to serve

all the purposes for which a steam-engine is required. The pump, when attached to the steam-engine, is to all intents and purposes a steam-pump, and one of considerable power, whose services can be called into action at any moment. It contains all those most desirable essentials—simplicity, durability and efficiency. So simple is it that the most ordinary mechanic can readily understand its construction and mode of action. It has double action, is heavily brass lined, water piston packed with either hemp, leather, or metallic rings. The piston, its rod, together with the valves, (both suction and delivery), as well as the valve-box, are all of brass. Good judges of pumping engines consider the arrangement of the valves, and the facility with which they can be taken out and replaced, as well as their construction, quite superior to all others.

All manufactories and dye-houses are constantly liable to destruction by fire, and this pump attachment to a steam-engine is therefore a thing very much to be desired as a safe-guard in all such places.

There is one peculiar feature regarding this steam-engine, that the complicated valve-gear found in all direct acting pumps, is in this, entirely avoided. Here is what we consider to be a very favorable feature of the engine, and one which should not be lightly overlooked.

The pump in connection, must as a boiler feeder, be a remarkable acquisition, and one which it would be desirable to have, both for convenience and safety, as the boiler is at once supplied.

The pumps are made in different sizes, and in case of fire the smallest size can be run up to two hundred revolutions per minute, affording a perfect protection against fire, and as reliable a one as is yet to be found. It will force water to long distances and to great heights, and its massive proportions and very great strength causes it to be very durable, and consequently economical, not to speak of the comparative minimum of cost and expense of operating them.

This pump is deservedly growing in popularity, not alone for its usefulness in immediate combination with the steam-engine itself, but on account of the care and particularity with which it is constructed it is always reliable as well as useful.

This combination of steam-engine and steam-pump is put upon the market by the Philadelphia Hydraulic Works, and is well worthy of attention on the part of manufacturers and dyers.

On Ostrich Feather Dyeing.

BY PAUL ALEX, PRACTICAL FEATHER DYER.

(Continued from page 151.)

When acid is called for to assist in the production of a *garret*, the feathers should never be dried up until all the acid is rinsed out of the fiber. It is quite unnecessary to use acid except in a case where you get your feathers accidentally darker than your sample, in which unfortunate event it is the not uncommon custom with many dyers to dissolve some acid, (either sulphuric or oxalic) in their starch-water, passing their feathers through it until they have acquired the desired shade. If the feathers were to remain concealed from the sun and light instead of having to be worn and exposed to both, that process for obtaining the desired shade would be

found to answer very well. But the color is exposed only a few hours when the acid begins to leave the fiber, and in a few days the color, which, when leaving the bath, a really bright shade of garnet, will, under those circumstances, assume a washy, smoky color. The best method of treatment in case of the garnet turning out too dark for the sample, is to thoroughly rinse off all the loose color and then mix a bath of strong sulphuric acid, say one part acid to thirty parts water at a tolerably high temperature. Allow the feathers to remain in the bath until they have changed to a Bismark brown. Take them out and thoroughly rinse them; at the same time being very particular as to the rinsing, because the very smallest amount of acid will ruin your bath. After having extracted the color from your feathers mix a fresh bath, making use of your judgment with reference to the shade you have to match. And here let me remark, before going further, that judgment in the mixing of colors is the one thing wanted; for without good judgment it is wholly impossible to become a good capable dyer; and although I am fully aware that I have made this same remark before, so emphatically true is it that I feel that I cannot say it too often. I certainly know of no trade that calls for more judgment than that of the dyer. A dyer may have in his possession a thousand recipes, yet without practical knowledge they are wholly useless to him. Let me take an instance. Mix a garnet bath or one of any mordant whatsoever, and enter 1 lb. of Egyptian bronze, also 1 lb. flat bronze, and 1 lb. grey Egyptian plumes, also 1 lb. of white Cape goods; I allow them all to enter one bath and let them remain in it for a quarter or half an hour, or even until such time as the bath is cold. After drying them up I find the result to be as follows: The Egyptian bronze is about four or five shades darker than the flat bronze; the Egyptian grey plumes are about three shades lighter than the Cape plumes; in fact there are four very distinct shades, all dyed in the one bath. A practical dyer will at once understand how to prepare his feathers for the bath, so that they will all turn out alike. It frequently happens in stores where a large stock is carried, that there are numerous colors to be changed each season, such for instance as making bottle greens to navy blue, seal brown, garnet, or any other dark colors. It is always well to extract as much of the old color as possible before proceeding to put in the new; but in changing browns, greens, blues, or any dark colors to blacks, it is unnecessary to extract any of the color, with the exception of dark reds, in which case extract all the old color possible. In every case where acid is used to extract with, be sure to have the fibers and also the quill free from acid.

It may be necessary after your feathers being submerged for a while in acid, to use hot water for rinsing, if so, use it, and before entering in the bath allow them to remain submerged for about a quarter of an hour in either boiling water, or water heated to a high temperature.

(To be continued.)

Red prussiate can easily be manufactured by dissolving yellow prussiate, making the solution alkaline with caustic potash, and keeping it at a boil with a sufficient quantity of peroxide of lead. On filtering and evaporating the liquid, the red prussiate is obtained in fine crystals.

Nitrate of iron and its Derivatives.

The many preparations made from this article, and the variety of forms it assumes with its own and other acids, render it a most useful assistant to the dyer, as it is in each and every one of its forms an important item in the production of blues and blacks. In fact so great is the variety of its applications, and so numerous the processes in which, in one shape or another, it takes part, that nitrate of iron may well draw the particular attention of every person at all interested in the art of dyeing. Whilst one preparation contains nitric as its only acid, others have sulphuric and nitric in a variety of proportions, and others yet nitric, sulphuric, and acetic acid. Some assume the form of perfect per-salts of iron, but far the greater part contain proto-salts in greater or less amounts. Scrap-iron supplies the source of some, and copperas others, while some again are derived from a mixture of both. There are those which are prepared from pre-existing nitric acid (double or single aqua-fortis) whilst in others the iron is dissolved by nascent nitric acid, set at liberty during the process by the action of sulphuric acid upon nitrate of soda, varying as much as from 40° to upwards of 100° Twaddle. To begin with, we have "blue irons," such as are used in printing or dyeing blues on silk or cotton with the assistance of prussiate of potash. It should be observed that blue irons ought to be more sharp than irons for other purposes. Should the iron be disproportionate to the acid, a part of the prussian blue formed will be found deposited at the bottom of the dye-pan, and what is fixed upon the goods will be dull, cloudy and loose. But, for all that the nitrate of iron must not be too raw, for if it is, a thin hungry color will be the result, and the free acid will be certain to damage the goods. If it be silk or cotton skeins that are to be dyed, their results can be attained very nearly approaching a pure per-salt of iron, by means of a blue iron made from copperas; giving results far superior to those obtained from a true nitrate from aqua fortis and scrap-iron. Should it be piece-goods with a cotton warp that are to be dyed, supposing the worsted or wool to have received its required color from one of the aniline blue dyes, a blue iron made from copperas is not admissible, on account of its staining the cotton somewhat. If the required shade be a sky-blue, or if it be for conversion into a green by the application of a yellow, it is then advisable to use a blue iron made from hoop-iron dissolved in citric acid. All black irons, or such as are used for dyeing or for printing blacks upon silk, wool or cotton, in conjunction with galls, myrobalsam, logwood or anything containing tannin, require a different preparation. It is highly necessary to have thorough saturation; this is of the greatest importance, as raw acid acts most detrimentally upon both the goods and the colors. Still, there must not be any more iron present than exists in a true state of solution, delivered in a regular manner to the fabric. This limit once overstepped, the blacks will not alone be uneven and full of blotches, but be also, in all probability, streaked and clouded with rust-marks, where oxide of iron has been deposited upon the fibers without being combined with the tannin. Irons made from copperas are, as a general thing, most decidedly preferable to those made from the metal for black purposes. It is not at all necessary that the iron should be in a state of peroxide; for theory and practice alike de-

monstrate that a fuller, brighter, and in every way a better black can be dyed with a nitrate of iron containing a proportion of protoxide. Should the amount of protoxide be too small, the black will necessarily be of a brownish cast. On the other hand, should the amount be too large, the result will prove to be a tone of too bluish a cast. Brown sugar of lead is sometimes added to the black nitrate of iron, by which means a portion of the sulphuric acid derived from the copperas is taken away, thus forming an insoluble combination with the lead, giving out acetic acid in its place.

Burling iron, as it is called, is the most difficult to successfully prepare of all these varieties. The peculiar name given to this article may have been derived from the following facts: In the dyeing of woolen materials, a number of small spots are exhibited on the surface where the color will not take. Such spots are termed "burls," and they have their origin in the stray portions of cotton mixed in with the wool, which do not take the color as the latter does, not having the same affinity for it; to remedy which, the whole piece is either passed through baths capable of bringing out on these cotton spots or "burls" a similar shade to that which exists on the wool; or, suitable liquids termed "burling inks," are applied to these spots with a blunt pen. A really good burling ink must cover well, that is, must entirely conceal the defective spots, and must perfectly agree with the color of the dye upon the wool. It must not, when dry, leave any glaze or shine on the spot. In fine, it must have no injurious action whatever, either upon the cloth's texture or color.

For printing, a nice balance must be preserved in irons. If too raw or acidic, the doctors and copper cylinders of the printing machines will be damaged, oftentimes very seriously. Not being subjected to a final rising, the finished goods are but too apt to be corroded into holes. When unwoven cotton warps are printed, the greatest freedom from this corrosive action is demanded.

The common or "saddenings" forms a third class of nitrate of iron; for instance, all such as are used in drabs, browns, clarets, and the like. All these should be somewhat sharper than the black qualities, so that the combination they form with sunae or galls, etc., may be faster and better able to stand subsequent treatment, either with alum or with preparation of tin. In fact they should, as nearly as possible, be perfect per-salts of iron and might be made either altogether from copperas, or they might contain a mixture of that and of metallic iron. On no account whatever should muriatic acid be used in the manufacture of nitrate of iron; the latter should be entirely free from any such impurity. Nitrate of soda should be wholly purified from chloride of sodium, for the reason that it delivers the iron exclusively upon the worsted and gives none to the cotton.

The following directions will be found useful in examining samples of nitrate of iron: Dilute with distilled water, adding sufficient pure hydrochloric acid to prevent sub-salts of iron being precipitated. Then chloride of barium in solution is added. The presence of sulphuric acid is shown by a white precipitate, either in addition as such, or in the form of copperas. To a small portion of the sample add pure ammonia till all the oxide of iron has been

precipitated. This is then filtered off and the clear liquor evaporated down to dryness and the residue heated to redness in a small platinum capsule; should any fixed matter remain, the sample has been got up with *nitrate of soda*. For the detection of *alumina*: Dilute a portion of it with distilled water, to which add a little pure nitric acid to prevent turbidity; add a solution of nitrate of silver, and if *auric acid* be present, a white curly precipitate will indicate it. In order to find if any portion of the iron be in the state of protoxide, cautiously drop in a solution of carbonate of soda, and a uniform pale yellow will indicate if the sample is a pure peroxide; should any protoxide be present there will appear clouds of a greenish color in the liquid; or, a dilute solution of the red prussiate of potash may be added, which, if any protoxide exist in the sample, will give a blue precipitate. To discern the comparative acidity of two samples of nitrate of iron, measure off equal volumes, and drop carefully into each of them from a poutette, a standard solution of carbonate of soda till the exact point is reached, when litmus paper is no longer reddened by the liquid. The number of degrees of the poutette consumed in each case will show the relative acidity of the samples. Only samples which mark the same specific gravity or degree on the hydrometer can thus be compared. If there is a difference, the stronger must be reduced with water to the degree of the weaker, equal measures of each being then taken.

The brightness, fastness and evenness of the shades given by different samples must be judged by dyeing swatches of calico, or skeins of cotton. For blue irons, steep equal weights of perfectly clean calico in equal measures of the samples under comparison, previously diluting each with an equal quantity of cold water for equal times, lift them and allow time to drain, steep them for an equal time in an equal quantity of water, adding to each an equal quantity of prussiate of potash; finally lift the swatches, rinse, dry, and compare.

Black irons as tested thus: A fair average is coarsely powdered, and say 50 or 100 grs. weighed out and steeped in a pint of boiling water for a certain time; weigh out then some clean white calico, free from grease, stiffness, etc., steep for an hour in this infusion; take out, allow to drain, and re-soak in half a pint of cold water, to which is added 2 fluid drachms of nitrate of iron. Allow to lie in this liquid ten minutes, with occasional turning; take out, rinse in cold water, and dry. Compare the patterns, when the intensity and goodness of the color will give a practical view of the strength and value of the samples.

In testing saddening irons, after taking out of the iron liquor the swatches are each steeped in a solution of alum. After this treatment, that is preferable which looks fullest and brightest.

Cyanogen and its Compounds.

BY PROF. J. F. ELSOM.

(Continued from page 8.)

Some time ago this series was begun, but owing to illness, was not completed; and, in as much as another and more important subject is to be considered soon, we will conclude with a short chapter on the foregoing division.

The symbol by which we recognize this compound, or Pheny-

lamine is (C, H, N) and is but one of the very many products of coal tar made by distillation. Some time in the year 1826 or 1827, M. Unverdorphen knew of the constituent, as with his extensive and exhaustive experiments in the destructive distillation of indigo, he produced a somewhat oily liquid substance, called by him "crystalline." From this time to as late as 1835, the substance remained the same, when Runge, a German chemist and experimenter, succeeded in isolating from the oil of coal tar, a substance which, having the property of producing a beautiful blue color when subjected to the chloride of lime treatment, and he called it "*hyanol*." Here the matter rested until 1840, when another chemist showed that by treating indigo with caustic potash, it yielded an oil, which he called *aniline*, from the specific name of one of the indigo yielding plants, *indigo per a nil*.

Some time about this period it was discovered by investigations, that on treating nitrobenzol with a reducing agent, an organic base ensued, and the observer of this reaction gave it the name of *benzidine*. The celebrated and renowned Professor Hoffman, then a student in the extensive laboratory of Barou Liebig, set about investigating these variously prepared substances, and found them to be identical in composition and action, and thenceforth they took their place as one body, under the name *aniline* or *phenylamine*. We have taken pains to treat various samples of the substance to a technical, analytical test, and find it to vary very much; that which was proven to be the purest was a basic substance of a somewhat oily consistence, colorless and boiling at a temperature of 182° C. Dropped on clean sized paper it produces a greasy stain, which, owing to its volatilizing at an ordinary atmospheric temperature, quickly disappears. Exposed to the air of my laboratory, it absorbed oxygen rapidly, and assumed a deep brown color; it ignites very readily, and burns with a large smoky flame. It is possessed of a somewhat pleasant vinous odor, and a burning aromatic taste. It should be handled very cautiously, as it is a highly acid poison, does undoubtedly to a change of nitrobenzol into aniline within the stomach.

All chemists and dyers have known the readiness with which aniline, in some of its reactions, produces very brilliant colors ever since Runge produced it from coal tar. As late as 1858, however, it possessed no interest of value save to the scientist, but in 1858 Mr. W. H. Perkin obtained letters patent for a dye-stuff derived from aniline. About the time of the late French war another product of coal tar, magenta, from the battle fought at the time, was first introduced into commerce. Dr. Hoffman took up the matter and found upon investigation, that the composition of this dye have done more to place the entire industry on a satisfactory basis than any previous undertaking. He found the consistency a salt of a basic substance, to which he gave the name *rosaniline* (C₂₀H₁₂N₂O).

Concerning these dyes, Mr. Hoffman, to whom the industry owes so much, wrote in 1862, while it was yet in its infancy, "Instead of disturbing her annual millions for these substances, England will, beyond question, become herself, the greatest color-producing country in the world; nay, by the very strangest of revolutions, she may ere long send her coal-derived blues to Indigo-growing India, her distilled crimson to cochineal-producing Mexico, and her fossil substitutes for quercitron and safflower to China and Japan, and the other countries where the articles are now desired." How true!

THE quantity of tartar emetic (double tartrate of ammonia and potash) now used in conjunction with astringents in fixing the aniline colors is very extensive.

(From Deutsche Farber Zeitung.)

**Recipes for Dyeing.
GARMENT DYEING.**

To take off aniline colors from half-woolen stuffs, without damaging the goods.—The article is left during a night soaking in a hand-warm soap-bath, to which a little soda has been added. On the day following the article is washed in a fresh bath of the same contents, well rinsed; besides this apply a not too hot nor too strong nitric acid bath and rinse again thoroughly. This operation is suitable for violet, fuchsine, and sea-blue. Alkali-blue does not entirely disappear by this method.

If the dyes do not disappear according to the above described method, a light boiling with cream of tartar, alum, and oxalic acid, is the only remedy which might yet be tried. Whatever does not vanish now, cannot be removed at all without damaging the stuff, and such garments must be dyed either brown, black, or dark-green.

BLUE UPON HALF-WOOLEN STUFF IN A BATH.

At first the article is washed in hot water with Marseilles soap, and then rinsed through water. Thereupon a boiler is placed upon the fire, into which, upon 5 kilo goods, the third part of the quantity given below of acetate of alumina is contained. The goods are worked hand-warm, and after about 10 minutes diligent working, beaten up, and while thus frequently beating up, marine-blue is slowly added, while meantime it is heated to boiling. If the cotton thread is according to pattern, chloride of tin is added according to requirement, in order to clear (to brighten) the wool, and for every garment about 3 oz. of chloride of tin is calculated; for light shades less is needed.

The acetate of alumina is prepared as follows: Put into six buckets of water 1½ kilo crystallized alum and 750 grm. sugar of lead.

PINK COLOR FOR HALF-WOOLEN GARMENTS.

For 5 kilo, after the garments have been very thoroughly cleansed (scoured), they are placed for about four hours in 150 grm. tannin, thereupon drawn through a soap bath and finally finished dyed with a fine diamond fuchsine. The working must commence cold, and by a gradual heating to 40° C., the dye-stuff must be added in 1 portions.

In this manner an even pink color from the lightest to the darkest shade can be obtained, and as the weight of the dye-stuff is measured according to the desired shade, nothing positive can be given with regard to this.

FASHIONABLE BROWN COLOR FOR WOOLEN CURTAIN STUFFS.

For 7½ kilos goods, 1 kilo alum, 1 kilo sulphuric acid, 1½ kilo archil, 2 kilos curcuma, and 1 of a wine-glass full of sulphate of indigo are added to the dyeing bath, and the previously scoured and acerbated articles are placed into the vessel, boiled for 1 hour, and thus finished.

N. B. In place of curcuma, "genuine yellow" may be applied for all sorts of brown dyes, and for each ½ kilo curcuma, 34 grm. "genuine yellow" is calculated.

A FINE GENUINE GRAY FOR GENTS' WEARING APPAREL.

The well scoured article is boiled upon 5 kilos, by means of 250 grm. chromate of potassa, 25 grm. sulphuric acid, and 175 grm. cream of tartar. From this the rinsing is attended to, and in a fresh bath the dyeing is finished with wood. By applying a little logwood, a splendid silver-gray is obtained, by adding a little more somewhat of a bluish-gray; by adding more or less madder, red dye or brazil wood, fustic (yellow wood) every yellowish or reddish shade may be obtained. This is certainly the best and surest method to dye accurately according to the given pattern. Half-woolen stuffs

are, after a preparatory dyeing of the wool, placed into a nitric acid iron bath of some strength, working the article for 5 minutes, rinsing it well and finishing with logwood, while red dye-wood and fustic are used for shading.

GENUINE BLUE-BLACK UPON VELVETINE.

In acidulated color-water draw the article several times, rinse well, and place the velvet upon a strong logwood solution containing some soda. Thereupon place it in pyroligneous acid, and finish with chalk, then thoroughly rinsing and finish dyeing with logwood and soap.

GENUINE RED FOR HALF-WOOLEN GARMENTS.

The well scoured dress-goods are placed upon a pretty strong hot catechu bath, and when taken therefrom well rinsed; after this a boiling-hot dyer's bath is prepared, adding dissolved diamond fuchsine and yellow aniline thereto, according to the desirable shade, whether this is to be yellowish or blueish tint, adding to this bath a few knife-blade points of pulverized salt ammonia and soda and treat the stuff therein so long till the desired shade of color is obtained. If the stuffs are desired to be still of a darker shade of brown, it is in the power of the dyer to do so, by carefully placing the articles upon a very weak, hot bath of chromate of potassa.

The practical dyer will be able in this way, to obtain a very satisfactory result. A red-brown for half-lichen stuffs, especially ribbons, etc., succeeds very rapidly and surely. The articles are simply dyed upon clear catechu, and to the potassa with which the dyeing is thus well performed some fuchsine is added.

BLACK FOR (UNBOILED) SILK GARMENTS.

This stuff, as is well known, is very difficult to dye, and when the same is dyed according to the common operation for dyeing black silk with nitric acid iron, a good result is never attained.

After the stuffs have been boiled clean with soap add two draughts of strong sumac, and 4° strong proto-acetate of iron, rinse and pass it through a weak kali bath and dye very hot with logwood and fustic. Thereupon boil a few handfuls of saw-wort (serratula tinctoria), add half a ladle full of logwood decoction, further quarter of a tea-cup full of oil (which is previously saponified in a little water and soda), break the entire with verdigris, and place the garments therein for a period of a few minutes, and thus finish the operation.

"BLEUS GRIS D'ARMES" UPON HALF-WOOL.

After the wool has been dyed with some alum, precipitated indigo (blue carmine), and cloth-blue aniline, a medium strong sumac bath is prepared, handle the article in this for about one hour, darken the shade by applying a weak solution of photo-acetate of iron, rinse well and dye with 2 parts of methyl-green and 1 part methyl-violet, 5 B. If darker shades are desired, a little logwood is added to the sumac bath.

DARK-BLUE FOR HALF-WOOLEN GOODS.

The wool is dyed with alum, sulphuric acid, indigo-carmin, and acid-fuchsine. A cold sumac bath is then prepared, adding some logwood, treat the article with this bath for 1 hour, producing a darker shade by applying pyroligneous iron, rinsing well and dyeing with 2 parts methyl-violet 5 B., and 1 part methyl-green.

DARK-GREEN UPON HALF-WOOLEN GOODS.

The wool is slightly dyed with glanher's salt, alum, and sulphuric acid, indigo-carmin and fustic (yellow wood), after this placed upon commonly strong cold catechu, then a darker shade introduced by application of pyroligneous iron and now thoroughly well rinsed; thereupon a fresh bath prepared, logwood and fustic (yellow wood) added; half an hour hauled therein, and with methyl-green finish dyeing in a luke bath.

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Dr. M. FRANK, Manager.

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TEXTILE COLORIST, 566 Arch Street, Philadelphia.

As all our agents and solicitors are furnished by us with written authority, we request our friends not to favor those having no credentials from us.

NO SUBSCRIPTIONS RECEIVED FOR LESS THAN ONE YEAR.

CONVENTION TO PROMOTE THE SHEEP AND WOOL INDUSTRY.—We are pleased to acknowledge the receipt of the circular of Gen. Wm. G. LeDuc, Commissioner of Agriculture, Washington, inviting our attendance at the above convention, September 22, at the Main Centennial Exhibition, Fairmount Park, Philadelphia.

In our issue of last June we stated in reply to an enquirer, as to what was the origin of "Fuchsine," that it was a very beautiful color, but that "Magenta" had surpassed it in the market. This remark has called forth a letter from A. Poirier, of Paris, stating that "both names belonged to the same article, which is a French invention, patented by the Fuchsine Company (1859) whose rights were subsequently bought by our house. In France and other countries, the name 'fuchsine,' given by the inventor, has been maintained, while in England the name 'magenta' derived from the shade produced from fuchsine was subsequently adopted."

LONDON'S EXHIBITION FOR 1881.—Mr. P. L. Simmonds, Superintendent of the International Exhibition Department, Crystal Palace, Sydenham, London, has favored us with a detailed programme of the next year's International Exhibition of Wools, Woolen Manufactures, and allied industries, commencing in June and ending in October.

The evident object of this early announcement is to give those who may be disposed to seek a representation there, ample time for preparation. Manufactured dyes and specimens of dyeing, being amongst the matters to be admitted, we thus notify our friends of the fact, so that they may govern themselves accordingly. Mr. Simmonds will on application, furnish a detailed programme and all other information. His address is as above.

THERE is no medium through which the handy-work of the dyer can so readily and so generally meet the public eye, as that which is afforded by International Expositions and State Fairs. It is no more than fair to presume that everyone desirous of advancing his special interests in business, should seize the available opportunity of making that business as prominent as it can possibly be made; and this applies as much to the textile dyer as to any other of the great class of industries which combine to give prestige to a rising nation like ours. The State Agricultural Fair 1880, is to open next September, at the Exposition Building in Fairmount Park, where every opportunity will be presented for a representation of dyes and dye-stuffs, and where we fully expect to meet our friends with all their best efforts in the dyeing art, as well as in specimens of bleaching. No doubt the competition will be a worthy one, and certainly will attract the greatest attention. Therefore, we once again urge our friends to be up and stirring, not so much on a purely personal account, as on the score of nationality.

WE take pride in reviewing the successful career of the TEXTILE COLORIST, from its inception to the present time. Many who doubted the practicability of the venture at first, are now convinced of its stability, and have become warm friends and admirers. This we owe to an unwavering determination on our part to maintain a position of strict justice towards all, showing no favor to any who seek to make our sample columns a medium for putting their wares before the public. We have adopted from the start the idea of making our own tests of those colors sent us, to make sure there shall be no samples inserted which shall not perfectly answer their accompanying recipes. Moreover we have faithfully endeavored to provide the most solid and reliable information for our readers, and to this end have procured the scientific assistance of some of the best chemists and practical dyers. We have likewise liberally availed ourselves, by translations, of the most useful and interesting essays of our numerous French and German exchanges, whose European reputation stands first among the foremost.

As we have begun, so will we continue, and to this end we confidently look for the patronage of not alone subscribers, but also of advertisers, whose favors make the bone and sinew of all healthy publications, tend to promote their growth, and ensure their longevity.

WE have pleasure in welcoming back to our columns our former contributor, Prof. J. F. Elsom, after a tedious illness. He resumes his subject from No. 13 (January, 1880).

DYEING DEPARTMENT.

THE MONTH'S PRACTICAL RECIPES.

The following practical recipes, like all that will appear in this department, are verified as reliable and warranted to come out satisfactorily, provided the proportions are strictly adhered to, and the manipulation be workmanlike.

DIRECTIONS, NOTES AND COMMENTS.

☐ We have frequently been asked why we give the names of the makers of the aniline and dye stuffs we use when publishing the recipes accompanying our insets. The reason is: We can speak with authority for those we actually test; where anilines and dyestuffs of the same color, manufactured by other firms, may be equally good, but when treated according to our recipe, may not give similar results. In giving the name of certain manufacturers, therefore, we would not be thought partial to them. Each has his own mode of producing desired effects with his own dye stuffs.

Recipe No. III.

DARK GEN D'ARME BLUE ON WORSTED.

50 lbs. Yarn.

Dissolve 1 lb. Borax.

3 ozs. Alkali Blue, { Meister, Lucius & Bruening, Hoechst, A.-M.
6 " " Green. { Latz & Movius, New York, Boston, and
Philada.

Enter at 160° F., turn for 10 minutes while raising temperature to a boil, boil for 4 hour.

2d Bath, 4 lbs. Sulphuric Acid at 130° F., give 4 to 5 turns and wash.

The combination of the alkali blue with alkali green produces all shades of gen d'arme.

Recipe No. II2.

PLUM ON WORSTED.

80 lbs. Yarn.

Boil 8 lbs. Glaubersalt,
2 lbs. Alum,
4 lb. Tartar (red),
4 lbs. Sulphuric Acid,
10 lbs. Indigo Extract,
2 ozs. Purple 3 B,
44 lbs. Archil Extract.

Cool off, enter yarn and boil to shade.

Note 1.—In making those shades the dyer may watch that he gets purple aniline, which will stand acid, otherwise the shade will rub off.

Note 2.—Keep the shade on the blue cast, as the heat of the drying-room will bring the red out.

Recipe No. III3.

LIGHT BROWN ON CARPET YARN.

100 lbs. Yarn.

Boil 5 lbs. Glaubersalt,
3 lbs. Sulphuric Acid,
1 lb. Alum,
4 lb. Picric Acid,
2 lbs. Turmeric,
4 lbs. Indigo,

8 ozs. Archil Carmine. (W. Heuermann, N. Y. and Boston).
Enter yarn and boil 4 hours.

Recipe No. II4.

DAB ON CARPET YARN.

75 lbs. Yarn.

Boil 3 lbs. Alum,
2 lbs. Tartar (red),
2 lbs. Sulphuric Acid,
4 oz. Picric Acid,
1 lb. Indigo Carmine,
1 lb. Archil Carmine.

Enter yarn and turn to shade.

Note.—Clear the liquor to get even shades.

Recipe No. II5.

SCARLET ON WORSTED.

50 lbs. Yarn.

Dissolve 34 ozs. Scarlet, XX B, { Banning, Bissell & Co.,
2 ozs. Orange. { New York, Boston and Phila.

Add 8 lbs. Glaubersalt,
11 lbs. Sulphuric Acid,
4 lb. Alum.

Cool off; enter at 180° F., bring to boil and turn to shade.

This is a brilliant scarlet, dyes evenly and possesses extra strength.

Recipe No. II6.

NAVY BLUE ON SHODDY, HALF WOOL AND HALF COTTON. (STANIS PULLING.)

500 lbs. Shoddy.

Boil 10 lbs. Bichromate of Potash,
20 lbs. Alum,
5 lbs. Blue-stone.

Enter shoddy and boil for 14 hour, wash out and enter.

2d Bath.—80 lbs. Ground Logwood,
2 lbs. Oxalic Acid,
4 lbs. Archil Extract.

Boil for 14 hours and finish.

Recipe No. II7.

PURPLE ON WOOLEN YARN.

50 lbs. Yarn.

Boil 5 lbs. Glaubersalt,
5 ozs. Violet de Paris, 350 N B. { A. Poirrier, Paris.
{ Andreykovitz & Dunk,
Philada.

Cool off to 150° F.; enter quick; bring to boil, and turn to shade.

Recipe No. II8. (A).

GREEN ON WORSTED.

25 lbs. Yarn.

Dissolve 3 ozs. New Acid Green, { Fred. Bayer & Co., Barmen,
Germany, E. Schleich & Co.,
N. Y., Boston, and Philada.
3 lbs. Glaubersalt,
4 lb. Sulphuric Acid.

Clear the liquor; enter at 150° F.; turn lively, and bring slowly to a boil.

Note.—The aniline should be dissolved cold.

(Continued on page 181.)

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A 118 B



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PRICES CURRENT.

PHILADELPHIA, AUGUST, 1880.

DYES AND DYESTUFFS.

	lb.	\$	¢	6	6	8
Acetic Acid.....	1	50	00			
Alumina, Blood.....	1	25	00			
Alumina, Egg.....	1	25	00			
Alum, ground.....	1	25	00			
Alum, lump.....	1	25	00			
Anafo, prime.....	1	25	00			
Anattoine.....	1	1 30	1 50			
Aniline Oil, English.....	1	25	30			
Aniline Oil, French.....	1	25	30			
Aniline Salt, crystals.....	1	25	30			
Aniline Salt, cake.....	1	22	30			
Archil Liquid, best.....	1	16	25			
Argols, crude Operto.....	1	7	10			
Argols, crude Sicily.....	1	10	20			
Argols, refined St. Ant. Brown.....	1	28	32			
Argols, refined Gray.....	1	30	33			
Argols, refined Light.....	1	28	32			
Aqua Ammonia.....	1	5	6			
Aqua Ammonia, F. F. F. F.....	1	6	8			
Aurine.....	1	75	91			
Barbery Root.....	1	5	6			
Barwood.....	1	21	23			
Bi-Chromate Potash.....	1	13	14			
Bleaching Powder.....	1	21	3			
Bomx, refined.....	1	101	13			
Brazil Wood.....	1	3	5			
Blue Vitriol.....	1	7	8			
Bristone, roll.....	1	3	5			
Camwood, pure.....	1	12	13			
Camwood, No. 1.....	1	8	10			
Carbonte of Ammonia.....	1	20	21			
Caustic Soda, 90 per cent.....	1	4	5			
Caustic Soda, 70 per cent and over.....	1	28	22			
China Clay.....	1	24	00	25	00	
Citric Acid.....	1	90	95			
Cochineal, Honduras.....	1	70	75			
Cochineal, Mexican.....	1	65	70			
Cochineal, Black Teneriffe.....	1	70	75			
Copperas.....	1	1	1			
Cream Tartar, crystals.....	1	86	38			
Cream Tartar, powdered.....	1	30	38			
Crimson Spirits.....	1	13	14			
Cudbear, pure.....	1	20	25			
Cudbear, No. 1, French.....	1	15	16			
Cudbear, No. 1, French.....	1	22	28			
Cutch.....	1	10	11			
Divi Divi.....	1	50	00	75	00	
Dipping Acid.....	1	10	10			
Extract Fustic.....	1	19	24			
Extract Hyperic.....	1	19	24			
Extract Indigo.....	1	16	18			
Extract Logwood, bulk.....	1	9	9			
Extract Quercitron.....	1	7	10			
Flavine.....	1	25	30			
Fustic, Cuba.....	1	1	2			
Fustic, Maracalla.....	1	1	2			
Fustic, Sevinilla.....	1	1	2			
Gambier, bales.....	1	5	7			
Glauber's.....	1	11	12			
Green Ebooy.....	1	3	4			
Hyperic.....	1	3	4			
Iron Moss.....	1	4	6			
Iron Nitrate.....	1	6	8			
Indigo, Auxillary.....	1	10	12			
Indigo, Benga.....	1	1 45	1 55			
Indigo, Caracena, fine.....	1	95	1 10			
Indigo, Guatemala, fine.....	1	1 35	1 60			
Indigo, Madras, fine.....	1	95	1 05			
Indigo, Manila.....	1	85	95			
Lac Dye, fine powdered.....	1	18	22			
Lac Dye, good powdered.....	1	10	15			
Lima Wood.....	1	31	41			
Logwood, Campechy.....	1	11	2			
Logwood, Honduras.....	1	2	2			
Logwood, Laguna.....	1	23	23			
Logwood, St. Domingo.....	1	11	11			
Madder, Dutch.....	1	11	12			
Madder, French.....	1	7	8			
Maple Bark.....	1	2	2			
Muriate Dist.....	1	1 50	1 75			

	lb.	\$	¢	6	6	8
Muriate Acid.....	1	11	11			
Muriate Tin.....	1	84	94			
Muriate Tin, strong.....	1	19	22			
Muriate Tin, oxy.....	1	18	24			
Muriate Tin, crystals.....	1	21	21			
Niewood.....	1	21	3			
Nitrate Iron, pure.....	1	7	9			
Nitrate Lead.....	1	11	12			
Nitric Acid, (Aqua Fortis).....	1	7	9			
Nutgalls, Aleppo.....	1	26	28			
Orchille.....	1	16	12			
Oxalic Acid.....	1	16	11			
Perl Ash.....	1	6	7			
Persian Berries.....	1	20	28			
Pieric Acid.....	1	46	50			
Potash.....	1	5	5			
Prussiate Potash, yellow.....	1	27	31			
Prussiate Potash, red.....	1	65	70			
Quercitron.....	1	13	2			
Red Wood.....	1	21	2			
Red Sanders.....	1	3	4			
Stannate of Soda.....	1	18	30			
Starch, Corn.....	1	4	6			
Starch, Potash.....	1	6	6			
Starch, Wheat.....	1	6	9			
Safflower.....	1	24	40			
Safflower extract.....	1	7 00	8 00			
Salt Ammonia.....	1	12	13			
Salt Soda.....	1	12	13			
Sapanwood, ground.....	1	2	3			
Soluble Blue.....	1	60	60			
Sugar Lead, brown.....	1	100	11			
Starch, Wheat.....	1	22	24			
Sumac, Sicily, according to grade.....	1	75 00	80 00			
Sumac, Va.....	1	50 00	55 00			
Sulphuric Acid.....	1	1	2			
Tartaric Acid.....	1	55	60			
Terra Japonica.....	1	4	6			
Turnerite.....	1	7	8			
Ultramarine.....	1	13	25			
Vergilgris.....	1	30	35			
Wood.....	1	10	12			

BUSINESS OPPORTUNITIES.

F. J. BIRD, AUTHOR OF THE DYER'S HAND BOOK, is prepared to furnish reliable recipes in any branch of Dyeing, and will have pleasure in matching to any color or shade for special customers, of his new Aniline Colors. See advertisement, page 8.

Address, 212 St. Marks Ave., Brooklyn, N. Y.

FAST BLACK FOR PRINTING ON COTTON YARNS.—First method :

Extract of logwood at 81° Tw., 4 lbs.; dextrine, 4½ oz.; wheat starch, 4½ oz. Boil, stir till cold, and add black liquor at 39½° Tw., 1½ lb. Mix well and print. Air for a day, steam and rinse.

Second method : Extract of logwood at 81° Tw., 4 lbs.; tragacanth mucilage, 1 lb. Boil, stir till cold, and add bichromate of potash 4½ oz., blue vitriol 2½ oz. Mix, print, dry, air for a day, and steam.—Muster Zeitung fur Faerberei.

NEW METHOD OF PREPARING BLEACHING LIQUOR.—In decomposing chloride of lime for preparing bleaching liquor on the large scale it is advantageous to use, instead of soda crystals, the bicarbonate of soda. There is formed a fine crystalline precipitate of carbonate of lime, from which the supernatant liquid is easily decanted off, whilst when soda crystals are used an emulsion is formed which deposits but slowly. A slight excess of the bicarbonate is not in the slightest degree injurious. Bleaching liquor thus prepared bleaches perfectly and rapidly all kinds of linen and cotton tissues.—Muster Zeitung fur Faerberei.

(Continued from page 178.)

Recipe No. 118. (B).

NIGHT GREEN ON COTTON.

50 lbs. Yarn.

Put down over night in 15 lbs. Sumac; wring next morning, and enter bath of Oxy-Muriate of Antimony 2° T., give 3 to 4 turns. Let it remain for $\frac{1}{2}$ an hour, wash thoroughly and enter dye-bath at 80° F. of

10 ozs. New Acid Green. { Fred. Bayer & Co., Barmen, Germany.
E. Schilbach & Co., New York,
Boston, and Philada.

Turn while raising temperature to 120°, wash and done.

Recipe No. 119.

GARNET ON FLOSS WORSTED.

60 lbs. Floss.

Boil 6 lbs. Glaubersalt,

2 lbs. Alum,

3 lbs. Sulphuric Acid,

6 ozs. Orange A, { Badische Aniline and Soda Fabrik.
8 ozs. Maroon S, { Wm. Pickhardt & Kuttroff,
2 ozs. Fuchsin S, { New York, Boston, and Philada.

$\frac{1}{2}$ lb. Indigo Carmine.

Cool off; enter yarn, and boil to shade.

Note 1.—It is advisable to start a fresh vat with the omission of indigo carmine, as the tendency of the indigo to draw quicker than the aniline, will produce shabby looking shades; where the finishing with indigo after $\frac{1}{2}$ hour boiling, will make bright and even shades.

Note 2.—Any variety of garnets, maroons, Bordeauxs, etc., can be made by the combination of these anilines.

Recipe No. 120.

GREEN ON COTTON.

50 lbs. Yarn.

Put down over night in 12 lbs. Sumac; next morning wring, and enter bath of Oxy-Muriate of Antimony 2° T. Let lay for $\frac{1}{2}$ an hour, wash thoroughly, and enter dye-bath at 80° F. of

10 oz. Emerald Green. { Badische Aniline and Soda Fabrik.
Wm. Pickhardt & Kuttroff,
(New York, Boston, and Philada.

Raising temperature to 120°, turn to shade.

Recipe No. 121.

CRIMSON ON CARPET YARN.

100 lbs. Yarn.

Dissolve 10 lbs. Glaubersalts,

2 lbs. Alum,

3 lbs. Sulphuric Acid,

8 ozs. Scarlet, { J. Levinstein, Campbell & Co.,
3 ozs. Fuchsin, { New York.

Enter at 180° F., give 10 turns while raising temperature to boil, and turn to shade.

Recipe No. 122.

BLUE ON COTTON.

50 lbs. Yarn.

Dissolve 2 lbs. Sal Soda,

4 lbs. Alum,

4 ozs. Tartaric Acid,

10 ozs. Cotton Blue 3. { Badische Aniline and Soda Fabrik.
Wm. Pickhardt & Kuttroff,
(New York, Boston, and Philada.

Enter yarn at 100° F., turn to shade, while raising temperature to 120° F.

NOTES OF THE MONTH.

All communications under this head will meet with due attention, and coloring matters will be fairly tested.

MEMBERS. WM. PICKHARDT & KUTTROFF, N. Y., will present in our September number a sample sheet of different colors dyed on wool with Artificial Alizarine, [patented], and their practical recipes.

F. BREIT & Co., are manufacturing a substitute for indigo. We have seen some dyed samples which are very nice, and ere long we expect to sample them.

We have seen some prints on calicoes, done with Gentiana Blue Paste, Royal Blue Paste, and Aniline Blue Paste, products of the Actien Gesellschaft, Berlin: Henry A. Gould agent, Boston, which are fast to light and soap.

ALEXANDER BARRIL, N. Y. agent for Pateaux Blue is meeting with encouragement amongst the finer dyers of blue goods. The brilliance of Pateaux Blue is superior to indigo, stands acids, air and light.

THE BOSTON DYE-WOOD AND CHEMICAL CO.—Extract of Bark, 51°. We had opportunity to make several dyeings and found it an article worthy of commendation.

WM. DAWSON has sent us a sample of Chesapeake Flavine.

E. SCHLBRACH & Co., N. Y., have shown us a New Blue and a New Bismark Brown, dyed with sulphuric acid only. They claim their new product to be fast.

JOHN H. MACDONALD, agent for the Boston Dyewood and Chemical Co., is visiting Philadelphia and its surroundings. We confidently bespeak for him a generous reception on the part of all our friends.

MR. LYNN C. TROUTMAN has opened an office at 53 N. Front Street, as agent for Bird's Aniline Dyes, Etc. We do not doubt his success as an active energetic agent.

THE Lewiston Bleachery yard has an animated appearance. Large extra crews of men are at work, moving the machine and carpenter shops, excavating for the new brick coal sheds, putting in new machinery, and making ready for large extensions of the boiler and dye houses. A stone culvert 304 feet long has been built to carry the drainage off into

the main waste-way, thus making a secure foundation. The brick boiler house and brick dye house will be extended back 30 feet. Both buildings are about 50 feet wide. This fall, Mr. Dempsey, the agent, will put in a new Corliss boiler, of 325 horse-power. It will be the largest one in Maine, and an immense reservoir for steam. The bleachery has recently made a specialty of dyeing yarn, and a new wooden building for a black dye house is now receiving the shafting and machinery. Fourteen machines will be put in. Mr. Dempsey's enterprise is building a colossal institution out of the bleachery.

OUR TABLE.

THE ENGINEER'S HANDY BOOK. By Stephen Roper, Engineer, Philadelphia. E. Claxton & Co.

Here is another aid to engineering by a well known author who has already done much in the way of practically educating scientific students. The work before us is one of 678 pages of the most useful information, partly original, but mostly collected with skill and judgment from European authors of unquestionable ability. It treats exhaustively on the most recently invented adjuncts to the steam-engine, and gives very full formula by which engineers can accurately calculate power and make reliable estimates in all branches of their profession. It likewise presents the most desirable instructions to young men wishing to stand examination for the United States Navy or Revenue Service, as well as the merchant marine. It is fully illustrated, and got up in a style commendable in the publishers and flattering to the author.

THE TEXTILE INDUSTRIES OF PHILADELPHIA, 1880. By Lorin Blodget.

This is one of those productions of earnest capable labor that confer a solid benefit on the community. We know no man more fitted to the work, and the work itself indorses our judgment. It is clear, comprehensive and correct; printed in good style, and altogether a desirable book of reference.

ILLUSTRATED DICTIONARY OF COMMERCE AND MANUFACTURES. By L. de Colange, LL.D.

Neither manufacturers, merchants, nor anybody engaged in the affairs of this world can reach success without a fair amount of proper information pertaining to their respective callings. The inner cause of acquired wealth or fame has invariably been granted by some special and well-practiced knowledge on the profession engaged in. Therefore a book containing the newest and most accurate information on commerce, manufactures, finance, law, and general economy cannot fail to promote the interest of the attentive reader who will judiciously consult it. We have such a book before us; it is the *Dictionary of Commerce and Manufactures*, just published by Dr. L. de Colange, through Estes & Lauret, Boston.

Dr. de Colange, the learned author of *Zell's Encyclopædia the National Encyclopædia*, and other valuable works, now standards in America, has condensed in this remarkable dictionary an immense mass of useful and precise information.

Every manufacturer and trader can find in its instructive and elegant pages principal notions of any business with its broad surroundings in the world. It is really a commendable book, and the only one of the sort published in America. The English Dictionary of

McCollough is now so antiquated that a fresher and more adequate source of information was almost a necessity for this progressive country. It certainly will fill a gap in manufactures and trade in repaying manifold its moderate cost, \$6.75 per volume. Two volumes complete the work.

QUERIES AND REPLIES.

Under this head we invite all our friends to make their inquiries on every subject connected with dyeing, etc., and we will endeavor to give them such information in answer as they are in need of. We also invite others to give us the aid of their experience in such replies. All will be welcome.

QUERIES.

76.—Can you give any particulars in regard to the "New Aniline Oil" for the production of non-greenable aniline black? Is it in the market? If so, where can it be obtained?

W. J., Providence, R. I.

77.—Please advise how to prevent the *browning* of aniline in using fuchsine for solferino? J. B.

78.—I wish to enquire if there are any of the aniline scarlets I can use in coloring wool for striping the borders of white blankets? It must be perfectly fast to soap, and the color must not run so as to tint the white. 2d. What is the formula for the above; or is there any? SUMMIT.

79.—Please answer the following questions: 1st. What is the best formula for coloring wool black, using extract of logwood as the coloring matter? 2d. By what process can wool be colored *scarlet* which will retain its shade and brightness in fulling and at the same time be done at a more moderate cost? 3d. Can cotton (loose) be colored *light-blue* which will stand the fulling process and not be too expensive? Can you give me the formula? SUBSCRIBER.

ANSWERS.

76.—This "New Aniline Oil" is not on the market in this country.

CORRESPONDENCE.

In this department of the *TEXTILE COLORIST* we propose to publish all letters pertaining to the business of dyeing, bleaching, etc. But we wish to be distinctly understood that we will not hold ourselves responsible for any opinions set forth by writers.

MR. BIRD'S REPLY TO MR. LAMBERT.

Mr. Editor.—With reference to Mr. John Lambert's letter in your July issue, I wish to make a few remarks. From the interview he had with me previous to making his second experiment (his first was an old fashioned idea) he perfectly understood from me that *one liquor only* was what I was seeking; and I may here say that even with his two there was but very slight improvement. By the smell and the feel I recognized the very formula by which it was done, and I certainly will not believe that a *half cent per pound* will cover all the cost, including as it should, the labor for extra washing, which the second bath needs, and without including which the cost would not be as he states. I did not wish therefore to put Mr. L. to the trouble of doing what I knew would be a failure. I could have made use of his formula if it met my requirements, but it is useless to me now. Nevertheless, if he desires to put it to the test,

I am willing that an umpire should be appointed and its merits demonstrated under the simplest conditions. That the expense of the experiment shall be borne by Mr. Lambert, as, since my separation from the Leeds Manufacturing Co., I have no facilities for doing the same.

Secondly.—That the rags shall consist of the usual quantity of dark stock, and that in the event of either success or failure, that this experiment shall be decisive, leaving the rags quite neutral (as claimed by Mr. L.) so that they will be fit for either aniline or wood colors.

Thirdly.—That if the experiment be made it shall be in September.

Lastly.—That a few days notice be given me previous to the experiment.

Now, surely, there is here no new feature, and should Mr. Lambert be successful within the two hours, and at half a cent per pound, I will cheerfully hand him the \$100.

Mr. Lambert says his expense in the experiment was considerable. It should have been but very trifling, and if of consequence to him, and if fairly done, I will reimburse him, although of course, I am under no obligation to do so. Yours Truly,

F. J. BIRD.

"Azo" Dyes.

The following catalogue of the so-called azo coloring matters by Prof. Otto N. Witt, of Mulhouse, is translated from the *Chemiker Zeitung*, and will throw a valuable light on the names, properties, and sources of these dye-stuffs.

In testing these colors two reactions are generally sufficient—the first, which can be applied on the fibre, consists in noting the coloration produced by concentrated sulphuric acid, and the change of such coloration on dilution with water; the second test consists in observing the form and solubility of the lime salts.

A.—Basic Azo-dyes, not containing Sulphur.

1. Chrysoidine, prepared from diazobenzol chloride and phenylendiamine, becomes yellow if sprinkled upon concentrated sulphuric acid; on dilution with water it turns first red, but afterwards an orange-yellow; solutions containing 4–5 per cent. chrysoidine congeal on cooling to a blood-red jelly.

2. Phenylen brown (Manchester brown, Bismark brown, or Vesuvine) is obtained by treating the murate of phenylendiamine with salts of nitrous acid. It dissolves in sulphuric acid with a black-brown color, which becomes orange on dilution.

B.—Acid Azo-dyes, derivatives of Sulphanilic Acid.

3. Tropaeoline Y, a product of the reaction with phenol; a pale yellow powder, which dissolves in concentrated sulphuric acid with a brownish yellow color, but becomes a pure yellow on dilution. The aqueous solution gives a finely crystalline white precipitate on the addition of chloride of calcium.

4. Tropaeoline O (chrysoine, chryseoline), a derivative of resorcinol. The solution in sulphuric acid is yellow, and on adding chloride of calcium there is a deposit of golden yellow scales.

5. Tropaeoline OO (Orange IV., Jaune d'Aniline), a derivative of diphenylamine. Dissolves in oil of vitriol with an intense violet-blue, but becomes reddish-violet on dilution. The lime salt is white and quite insoluble.

6. Gold orange (Orange III., Tropaeoline D, Helianthine), a derivative of dimethylamine. Dissolves in oil of vitriol with a yellowish-brown, becoming a pure splendid red on dilution. This color is permanent even if extremely diluted. The lime salt consists of sparingly soluble iridescent scales. Sold as a salt of ammonia.

7. Tropaeoline OOO, No. 1 (Orange I.). A derivative of α -naphthol. A reddish-brown powder or iridescent green crystals. Dissolves in oil of vitriol with a reddish-violet, turning red on dilution.

8. Tropaeoline OOO, No. 2 (Orange II.; *b*-naphthol orange, chryseurine), a red powder. Dissolves in oil of vitriol with a magenta-red, but turning orange on dilution. The lime salt is readily soluble in hot water.

C.—Colors closely connected with the group B, but different in their preparation.

9. Echt Gelb. Fast yellow (Grassler's patent); obtained by sulphurizing anidazo-benzol. Dissolves in concentrated sulphuric acid with a yellow color, turning a salmon-red on dilution.

10. Jaune N (Poirrier's), closely connected with Tropaeoline OO. The solution in oil of vitriol is green, becoming blue on dilution, and finally violet.

11. Orange G. (Meister, Lucius, and Bräunig). Dissolves in oil of vitriol with an orange color, which does not alter on dilution.

D.—Derivatives of the Naphthionic Acids (Sulphonaphthylamine Acids).

13. Rocelline (Orscilline No. 3, rubidine, fast red and sauracine). A product of the action of diazonaphthionic acid upon *b*-naphthol. First made by Poirrier, then by Williams, Thomas, and Dower, and some months later by the Baden Aniline and Soda Company. Dissolves in oil of vitriol with a violet-blue, like Tropaeoline OO; turns brown and turbid on dilution. The lime salt is insoluble, red-brown and gelatinous.

Rocelline mixed with *b*-naphthol orange (No. 8) forms the so-called rouge français. Naphthol-orange is much used in mixtures, e.g., with eosine-scarlet.

E.—Derivatives of *b* Naphtholdisulphuric Acid.—

(Meister, Lucius, and Bräunig's Patent.)

Of the many dyes of this kind introduced into the market by this firm, the more important are here mentioned:—

14. Poncaou G. (Yellowish-scarlet.)

15. Poncaou R. (Reddish-scarlet.)

These are products of the action of diazoxytol upon the salts G and R of the above-mentioned patent.

16. Poncaou RR.

17. Poncaou RRR, products of the reaction of higher homologues of diazoxytol upon the same salts.

The solution of the last four dyes in sulphuric acid is red, with a yellowish tone; no change on dilution.

18. Bordenaux, product of the reaction of diazonaphthaline upon *b*-disulpho naphtholic acid. Dissolves in sulphuric acid with an indigo-blue color, which turns violet on dilution.

19. Coccine. Dissolves in oil of vitriol with a blueish-red; pure red on dilution. Here belongs "Ponceau Suextra," a mixture of acid magenta, with a ponceau obtained from *b*-disulpho naphtholic acid.

F.—Tetra-azo Dyes.

20. Biebrich scarlet. The result of the action of the diazo-compound of fast yellow with *b*-naphthol-soda. Dissolves in oil of vitriol with a splendid emerald-green, which turns, blue, violet, red, and is finally precipitated. This last feature is a distinction from saffranine, which undergoes the same changes of color.

The derivatives of picramic acid, oreocelline 1 and 2, have not been adopted in the trade.—*Chemical Review.*

From Münster Zeitung.

Brown Colors on Cloth.

BRONZE ON CLOTH.

(For 44 pounds.)

Prepare a bath of

- 44 pounds of Fustic,
- 3 " " Logwood,
- 2½ " " Red Sanders,
- 3 " " Sumac,
- 2 " " Cream of Tartar,

Boil 2 hours; sadden with 2 pounds Blue Vitriol; boil 1 hour; add 2 pounds Copperas and boil 1 hour also.

BRONZE—OLIVE FOR CLOTH.

(For 50 pounds.)

Prepare a bath of

- 38 pounds of Fustic,
- 3 " " Logwood.
- 4 " " Red Sanders,
- 1 " " Sumac,
- 2 " " Cream of Tartar.

Boil 2 hours and sadden with

- 2 pounds of Blue Vitriol, boil 1 hour; add
- 2 " " Copperas, and boil 1 hour.

BROWN ON CLOTH.

(For 60 pounds.)

Prepare a bath of

- 45 pounds of Fustic,
- 3 " " Logwood,
- 3½ " " Sumac,
- 15 " " Red Sanders,
- 2½ " " Cream of Tartar.

Boil 2 hours and sadden with

- 2½ pounds Blue Vitriol; boil 1 hour; add
- 2½ " " Copperas and boil 1 hour.

DARK BROWN ON CLOTH.

(For 68 pounds.)

Prepare a bath of

- 60 pounds of Red Sanders,
- 6 " " Logwood,
- 20 " " Fustic,
- 3½ " " Sumac,
- 2½ " " Cream of Tartar.

Boil 2 hours and sadden with

- 2½ pounds of Blue Vitriol; boil 1 hour; add
- 2½ " " Copperas; boil until done.

BROWN ON CLOTH.

(For 130 pounds.)

Prepare a bath of

- 120 pounds of Fustic,
- 4 " " Logwood,
- 6 " " Sumac,
- 7 " " Turmeric,
- 28 " " Red Sanders,
- 5 " " Cream of Tartar.

Boil 2 hours and sadden as above, with

- 4½ pounds of Blue Vitriol,
- 4 " " Copperas; boil until done.

BROWN ON CLOTH.

(For 200 pounds.)

Prepare a bath of

- 180 pounds of Fustic,
- 9 " " Logwood,
- 6 " " Sumac,
- 14 " " Turmeric,
- 125 " " Red Sanders,
- 8 " " Cream of Tartar.

Boil 2 hours and sadden as above, with

- 5 pounds of Blue Vitriol,
- 10 " " Copperas; boil until done.

FAWN COLOR ON CLOTH.

(For 50 pounds.)

Prepare a bath of

- 15 pounds of Fustic,
- 3 " " Sandal Wood,
- 3 " " Red wood,
- 2 " " Mulle Maddar,
- 2 " " Maddler,
- 1 " " Sumac,
- 4 " " Logwood,
- 2 " " Cream of Tartar.

Boil 2 hours and sadden with

- 300 gramm Blue Vitriol,
- 80 " " Copperas; boil until done.

If the recipes here given (which are all approved), are strictly carried out, good results must positively be attained.

Logwood Blues on Wool.

By means of logwood, certain deep blue shades are produced upon wool, which are much used in various mixtures. These shades are the blue "du Roi" and the blue "d'Enfer."

To obtain these colors it is necessary to prepare a beek in which there is boiled a small quantity of logwood; after this bath has boiled for a short time, there are thrown into it, for 220 lbs. of wool,

Alum	22 lbs.
Argol	4 lbs. 6 ozs.
Blue-stone	2 lbs. 3 ozs.

The wool is plunged into the beek, worked well, and kept at a boil for three hours. It is then washed well, and in the meantime the quantity of logwood necessary to complete the color—say 33 to 36 lbs. in shavings—is boiled in the same beek. The wool is then re-entered and boiled for an hour, taking the precaution to turn it well whilst boiling.

After this boil, the wool is withdrawn and re-entered again when the beek has boiled for an hour and a half. The wool is washed again, a small quantity of blue-stone is dissolved in the bath, and the wool is re-entered and worked for half an hour without being brought to a boil; it is then taken out, aired, and washed.

The properties of logwood are turned to account to produce upon pieces half-fast blues, known as common blues. They are ground in the vat to half the depth of color intended, and the piece is then dyed out with logwood.

A piece of Vienna cloth, for instance, which weighs about 66 lbs., is first dyed a sky-blue in the vat.

It is then milled and washed very carefully. A beek is made up in which is boiled first a quantity of logwood, and in which is dissolved—

Alum	4 lbs. 6 ozs.
Red argol	17½ "
Blue-stone	4 lbs. 6 "

The piece is entered and turned rapidly for two hours. The piece is then taken out, the boiling being still kept up, and 8½ lbs. logwood are thrown in and boiled for fifteen minutes.

The piece is then re-entered and worked rapidly for an hour, still at a boil; it is lifted again, aired, and cooled, while the beek is still kept at a boil.

A third immersion now takes place, in which is repeated what has been just described in the second. A small quantity of blue-stone is then dissolved in the beek and a smaller weight of copperas, and the pieces are turned in the beek, without bringing it to a boil, until the desired shade is obtained. After this process it is thoroughly washed.

In the dye-works of the south they have a more expeditious way of rising the color, by means of which they get brighter shades.

When the pieces have got their light blue ground they are boiled with logwood in the proportion of 55 lbs. of wood per 33 lbs. of cloth.

After boiling for half an hour there are added to the same beek

Tin crystals	2 lbs. 3 ozs.
Alum	17½ "
Red argol	17½ "

The pieces are entered into this bath at a boil, turning them rapidly, and after boiling for an hour and a half they are taken out and aired. About 7 ozs. of blue-stone are then dissolved in the pan per piece and they are then entered again and turned carefully and rapidly for 15 minutes, still at a boil. They are then taken out, aired, and washed.

All piece-dyed blue cloth met with in trade has received this brightening, which is really necessary, for cloths only take in the vat a superficial color. Thus we may see cloths piece-dyed in the vat which easily grow white by friction and wear, whilst cloths which have been brightened and penetrated with the logwood color never wear white.

Hence a vat-dyed cloth which has been subsequently brightened is preferable to one which has not undergone this process.

It is commonly found that logwood shades, when employed alone, and not in conjunction with indigo, do not yield pure blues, and are besides affected by even the weakest acids. M. Achille Gillet, a dyer, of Dauvillier, has devised a process for producing a pure and relatively fast blue by means of logwood alone, but he has not hitherto made it public. Its superiority over the common logwood blues is best seen in the light and medium shades.—*Trinturier Pratique*.

(Translated expressly for the TEXTILE COLORIST by J. Frankl.)

The Means of Finishing Textiles.

BY DR. H. GROTHE, PUB. D. A. POLYTECHNISCHE ZEITUNG.

The means for finishing vegetable fibres, especially cotton textures are the following:

I. The suitable means of finishing:—

Flour of Wheat and other species of Corn, Maize, Rice, Potatoes, Sago, Tapioca, Arrowroot.

The starch of these products.

II. Suitable means for finishing with prominently glutinous matter:—

Decoction of Sea-weed, Haio-Tuo, Agar-Agar.

Carrageen, Iceland (Irish) Moss.

Ceylon Moss.

Gums, Rosin, Colophony, Dextrine, Glucose.

Glue.

III. Suitable means for softening and making pliant, etc., used as admixtures:—

Glycerine.

Fats and Oils, Tallow, Marrow, Yolk.

Cocoa-nut Oil, Palm Oil, Castor Oil, Olive Oil, etc.

Wax, Paraffine, Stearine.

IV. Suitable means for weighting and filling:—

Sulphate of Barium, Heavy Spar (Barytes).

" " Lime, Gypsum.

" " Magnesium, Epsom-salt.

- " " Natrium, Glaubersalt.
- " " Protoxyd of Lead.
- " " Alumina, Alun.

Silicate of Magnesia, Soap-stone, Steatit.

- " " Alumina, China-clay.
- " " Natron, Soluble glass.

Chloride of Lime, Chloride of Zinc, Chlorure of Barium

Chloride of Magnesium.

Carbonate of Barium.

- " " Magnesia.

Mineral Blue, Ultramarine. (Refer also to I.)

V. Suitable means with an antiseptic effect:—

Carbolic Acid, Heavy Oils of Tar.

Cresote, Salicylic Acid, Strychnine, Acetic Acid.

Thymol, Tannin, Camphor, Oxalic Acid.

Pieric Acid, Sulphuret of Carbon, Cyanites.

Arsenite and Arsenic Acid.

Sulphate of Iron, Copper, Alumina, Zinc.

Chloride Combinations of Zinc, Aluminium, Magnesium,

Potassium, Barium, Natrium, Lime, Mercury.

Nitrate of Soda.

Boracic Acid, Chromic Acid.

Chromic Kali, Manganese.

VI. Suitable means for shading by admixtures:—

Ultramarine.

Cyanide of Potash.

Acetic Acid and Sulphate of Indigo.

Paris Blue with Oxalic Acid.

Aniline Blue, Aniline Violet.

Indigo Carmine.

VII. Suitable means aiming at making articles water-proof:—

Solution of Caoutchouc.

Linseed Oil, Rosin, Pitch, Tar, Petroleum, Paraffine.

Naphtha.

Green Vitriol, Acids, Acetates of Copper, Murates of Zinc.

Argalaceous Earth.

Tannin.

VIII. Suitable means of producing particularly dense surfaces on oil cloth:—

Embossed Calico and Packing Cloth.

IX. Appliances for producing incombustibility and preventing ignition:—

Sal-amoniack with Gypsum, Sulphate of Zinc.

Glaubersalt.

Phosphate of Ammonia, Phosphate of Lime and Ammonia.

Phosphate of Sodium.

Soluble Glass.

Ammonia Alum.

Hyposulphite of Soda.

Boracic Acid, Borax.

As a X. class, such substances may be considered which serve for especially preparing the substances for printing, hence all means

for increasing density, such as, starch, dextrine, albumen, casein, all sorts of gums, glue, isinglass, gelatine, etc., etc. The technic of cloth-printing, properly, in so far as it relates to the chemical process, will not be discussed in this article. We desist from entering here more fully into the explanation of those means of thickening, sizing, grounding, dipping, etc.

The classification as stated above, we have applied to an appropriate and effective use of the same. Of course other reasons for making classifications may prevail; as for instance, according to the derivation of the substances:

a, from the vegetable kingdom,

b, " " animal "

c, " " mineral "

But it will be at once obvious, that with regard to the purpose, the entire class c, is not comparable with those of a and b; and moreover, that by a and b, a particular division of the real substances for finishing and the different expedients must needs take place, which again reduced into subdivisions, would prevent a clear definition of the matter.

While entering into a more explicit consideration of the mentioned appliances for finishing, we note that the classes I, II, III, IV in general, do not require any introduction. Class V however, treats on antiseptic acting substances, and their admixture to the means of finishing—especially when the organic substances are applied as such in large quantities—becomes necessary. Flour, starch, fat, oil, etc., have an inclination, when influenced by moisture and heat, to mould, to decompose, and even to form animalic organisms, whenever the conditions for such are favorable, as for instance, the meal mite (*acarus farinæ*). Oftener than the mite, however, a fungus vegetation occurs in the finished textures. This fungi-formation has of late been thoroughly investigated by Berkely, Cooke, Pearson, Kunze, Link, Thomson, Brown, Smith and others. Not less than twenty-seven species of fungi, produced in cotton goods, have been proved. Those species mostly appearing were in first line *aspergillus* and *penicillium*, then follow *cladosporium herbarum*, *sporocybe*, *alternaria*, *diploia*, *mucon*, *mucoia*, etc. In the well known process, about 20,000 pieces of calico, which were infected with these fungi had reached their place of destination and were of course not saleable. The antiseptics therefore are intended to avoid this dangerous fungi-formation, and on the other hand also prevent the setting in of fermentation, whereby acids may be forming, which might not merely become damaging to the colors of the stuff, but often even endanger the durability of the fibres. The other classes, VI—IX, are intelligible from their titles.

The flours of the species of grain and of many other vegetables, have a long time since maintained their chief place for the preparation of the paste used by weavers and for finishing textures. Since the invention of the power-loom, the weavers' paste and dressing or finishing mass, have become steadily more identical, and to-day the pastes serve as finishing masses as well as for loading and filling substances upon the cotton chain.

Wheat flour has been most generally used; besides this the flour of maize, barley, rice, sago, etc., were applied. If wheat flour is used, it is usually first allowed to ferment, in order to remove a

part of the glutinous matter. It is mixed with water and left exposed to the air in vats. After the lapse of a few days a brownish foam appears. The upper liquor is drawn off, and the remaining mass is diligently stirred, with water newly added. Thus several days continue the operation, and a more or less pure wheat starch is obtained. Frequently the fermentation of but few days suffices, and the settled starch is boiled up in the above liquid, and the other finishing substances are added.

These means are employed because wheat flour, on account of its azotic matters, inclines greatly to the formation of fungi. By the process of grindling, there is always formed glucose (upwards of 4 per cent.), a substance very much inclined to decomposition. Furthermore gluten, fat, gum, etc., are contained therein. The storing in a damp place, causes at once a formation of mould in the flour. This nature the flour maintains also in the appliances for finishing, if fermentation has not previously taken place, and even this latter cannot entirely avert the danger. The admixture of antiseptic appliances as to their effect, has only been accurately investigated in more recent times. The transformation of flour into starch removes indeed, the azotic matters, and in this respect the starch substances are not so much inclined to the forming of fungi, as we will consider hereafter. The following analyses show the difference of composition:

	Water.	Fat.	Gluten.	Starch.	Gum.	Phos.	K. Ashes
a, Wheat Flour	16.50	1.20	11.08	66.27	3.33	0.44	0.26
Wheat Starch	15.87			82.81			0.16
b, Maize Flour	14.00	8.10	11.10	65.10		1.70	
Maize Starch	17.44			81.59			0.33
c, Rice Flour	13.00	0.70	6.30	79.50			0.50
Rice Flour	18.42			80.75			0.07

The starch in wheat flour is, of course, the desired substance for finishing, although the gluten matters are able to fix considerable quantities of china-clay, etc., upon the yarns and textures. In opposition to the danger, that the formation of fungi is greatly enhanced by the presence of azotic substances, we must declare against the use of unfermented flour, perhaps even the applying of flour generally is to be avoided. Besides this, wheat flour for the purpose of finishing is often adulterated by admixtures, as rice flour, chalk, gypsum, etc.

Maize flour also contains much azotic matter, and is in this respect very similar to wheat flour. It was first used for finishing in England in 1854, but much sooner in America. The maize flour is, as is rather remarkable, not by far so much inclined for the formation of fungi as wheat flour.

Barley flour also has been frequently recommended and used as a substance for finishing. Its application however, is not yet generally in vogue.

Rice flour contains less quantities of azotic matters, and is moreover less hazardous than wheat flour, to which it is often added.

(To be Continued.)

WE WILL pay 75 cents for January number, 1879; 50 cents for July, 1879; 40 cents for January number, 1880.

Dye for Hats.

Golden Maroon, or Alcan, with Chrome (2 doz. Felt Hats).—For the mordant beak take 16 pails of water, 2 ozs. chromate of potash, 1 oz. blue vitriol, and 1 oz. copperas, which should not contain any free acid.

Each substance is dissolved separately, and poured into the dye-pan. When it is boiling briskly the hats are plunged in, and left for half an hour; they are then lifted, taken through cold water, and when they have been drained upon very clean hurdles they are steeped for another half hour, and brushed inside and out in cold water.

Meantime the dye-pan is emptied out, cleaned, filled with water, adding

Young fustic, rasped.....	34 lbs.
Catechu	34 "
Extract of logwood.....	34 ozs.
Turmeric.....	14 oz.
Sanders.....	14 "

Boil well for an hour, strain the liquor, put it back into the pan, adding 34 ozs. of the purest alum; raise to a boil, and give the hats three steeps of half an hour each, taking them through cold water after each.

This operation demands the greatest care and cleanliness.

Another shade may be obtained by leaving out the turmeric, reducing the fustic by one-fourth, and increasing the sanders by 14 ounce.

A deep maroon may be obtained in a similar manner with the addition of 34 ozs. extract of logwood.

Havana shade is got by reducing all the dye-wares by one-half, and a noisette by reducing them one-quarter.

Hats should never be mordanted in the evening and dyed the next day. They would not be even.—*Moniteur de la Chapellerie.*

(Translated expressly for the TEXTILE COLORIST from *Moniteur de la Teint.*)

Bichromate of Potassa as a Mordant.

FOR LOOSE WOOL AND PIECES.

It is well known that all pigments, with exception of some anilines, have but little or no affinity for wool, and it is equally well known that for the fixing of pigments, mordants are used, which possess a great propensity to combine with the pigments.

Mordants do not merely fix the dye to the wool, but moreover impart to the former a fine appearance, so that by means of various mordants, various colors and shades may be produced, although but one single pigment may have been used. This appears particularly striking when logwood is used, a material so frequently applied in the art of dyeing. With bichromate of potassa as a mordant, this dye can be very profitably employed.

The aim which is sought to be attained by dyeing is:

1. To lose nothing of the dye-stuffs.

2. To fix the same as durably as possible, and to impart to it the desired lustre.

If the point in question is that of the dyeing of wool, further care should be taken, that the same during all operations retains its softness, a property which in regard to the fabric is of greatest importance.

The application of bichromate of potassa permits of the fulfilment of all these conditions, without regard to its low price. This mordant supplies all other substances which have been in use heretofore in a most satisfactory manner. Besides all this, it has over all the latter kinds, the other advantage, that the colors produced thereby, withstand the influences of light and air better than those attained by other mordants. Whereas the mordant mentioned has a strong affinity for wool, as well as for the dye-stuff; the fixing will be as complete as possible. Thence it follows, that for the attainment of a certain purpose, or certain shade of a color, less dye-stuff will be required.

The mordant in question offers besides this, one other essential advantage, viz., that the natural properties of the wool are changed thereby as little as possible, so that the wool treated therewith can be easily still further manipulated.

Furthermore has bichromate of potassa the valuable property, that by means of it, the genuine green, olive, and lead colors, as well as the indigo colors can be imitated, so that even the keen eye of the connoisseur cannot discern the difference between these spurious colors and the genuine, and in fact that this difference can be only established by the application of acids. Wool steeped in this way loses nothing of its dye during the operation of fulling. Treated with logwood, such colors are attained which cannot be produced by any other means. The quantity of mordants is in accordance with the quantity of the dye-stuff which is to be fixed; in the same mordant-bath all colors can be attained.

For this purpose we deduct for every mordant operation which is to follow the first one 20 per cent. of the quantity of the mordant; frequently the partly exhausted bath serves again in the preparation of other wool. The wool is to be gently boiled in the dye-bath for 1 of an hour.

When stored in open air (but well covered), wool dyed in this manner gains a double intensity of color. If it is intended that the color shall contain indigo, the latter substance and logwood may be applied; it is in that case almost as pretty and durable as the former dye-stuff alone.

By this mordant also a green with indigo, without using logwood, can be produced, by fixing the dye-stuff, fustic or weld (dyers weed). The wool dyed in this manner is in the first place yellow, then green, causes the blue of the warm steep to fade less, and is softer than if the yellow had been fixed with alum. The mordant is generally better suited for application with blue steeping than any other; it may even be asserted that it is preferable to all other mordants.

PREPARATION OF THE MORDANT FOR PRODUCING VARIOUS COLORS.

The quantity of the bichromate of potassa to be used depends on the following five conditions. If these have been well observed, the respective quantities will be easily attained.

The maximum of the mordant amounts to 24 kilos for each 100 pounds of wool. The quantity is fixed:

1. According to the quantity of the pigment which is to be employed. The less it is intended to fix the less is the quantity of the mordant required.

2. According to the fineness of the wool and cloths; the difference is estimated up to 3 per cent.

3. According to the greater or lesser facility with which the pigment combines with the wool.

4. According to the brightness of the shades to be attained, since the color loses by the decrease of the quantity of mordant.

5. According to the contents of the kettle in comparison to the quantity of the wool to be dyed.

Besides these statements, a few examples may find place here:

For 100 kilos fine wool or 120 kilos fine cloth.

Term of Steeping, 14 hours.

Term of Dyeing, 1 hour.

Color.	Mordant. kilos.	Color Logwood. kilos.	Fustic. kilos.	Ind or Brazil Wood. kilos.
Black	2,500	30—40	—	—
Slate Color	1,750	18—22	—	—
Gray	0,750	3—6	—	—
Lead Color	1,250	12—15	—	—
Vert Invisible	2,500	26	4	—
Vert nase	2,500	14	12	—
Dragon's bl'd (gr)	2,500	18	38	—
Bottle-green	2,500	15	25	—
Swallow-green	2,500	18	14	—
Myrtle-green	2,500	8	70	8
Dark-olive	2,500	12	60	10

To the lead color, slate color and gray, a yellow shade can be imparted by applying fustic, a red hue by Brazil wood, madder or red-sanders (sanders is used with the mordant in the same bath, while madder and redwood, etc., are employed in the second bath).

By changing the proportions of the logwood and fustic, numerous green shadings may be attained. Dyers' weed may be substituted for fustic, if so desired. In this case 1 kilo of dye-stuff to 3 kilos of the former is the proportion. For green the usual yellow woods are applied, such as, Jamaica, tampico, curacao and fustic, which furnish a less orange colored shade like the Cuba wood.

For olive-color, madder or red (Brazil wood) is used, in order to produce the red part of the shade.

LUMINOUS FLOWERS.—We have once spoken of the introduction of luminous effects into dress goods for ladies. We have now the satisfaction of saying, for the benefit of the fashion-loving section of the fair sex (not by any means a small section either), that among the elegant novelties of the hour offered for sale on the Paris boulevards are phosphorescent flowers, which glow with a laubent light in the dark, and almost rival their natural tints. They are rendered luminous by coating the petals with transparent size, and then dusting them with a phosphorescent substance, such as Canton phosphorus (sulphide of calcium) or Bologna phosphorus (sulphide of barium). Canton phosphorus is the best, and yields a soft, yellow light. According to M. Becquerel, a good quality can be made by mixing 48 parts of flowers of sulphur with 58 parts of calcined oyster shells, and raising them to a temperature of 800 to 900° C., in a crucible. After exposure to sunlight during the day, or to the electric or magnesium light, the flowers thus coated become brightly luminous in the dark. When ball dresses and flowers shall be made luminous, the blaze of gas will become quite superfluous.

Report of Patents Taken Out in Germany.

(By the *Badische Anilin- und Sodafabrik*.)

1st Process.—It is to transform naphthalamine by azotic and under form of diazoic derivative; and this product is combined in one of the two naphthols. The solution of chloride of diazonaphthaline obtained under the action of nitrate of sodium on the chlorhydrate of naphthalamine is slowly added to a diluted and alkalined solution of naphthol until there is a formation of precipitate. After having washed and dried the coloring matter, it is treated in a water-bath by 2 parts of smoking sulphuric acid containing 80 per cent. of anhydrite. The sulphonconjugated derivative is transformed into sodium salt.

2d Process.—The solution of chloride of diazonaphthaline is to be added to a cold and very alkalined solution of naphthol and mono or disulphonic. The alkalined solution is acidulous and the precipitate transformed into sodium salt of oxyazonaphthalinesulphonic acid.

3d Process.—The naphthalamine sulphonconjugated derivative is transformed into diazoic derivative correspondent with and combined to equal molecules of a "a and c" naphthol. One part of nitronaphtholine is mixed with 2 parts of concentrated sulphuric acid, and 1 part of sulphuric acid to 80 per cent. of anhydrite, the mixture heated by means of a water-bath until complete transformation of the nitronaphthaline. The solution of nitronaphthalinesulphonic acid diluted in 10 times its volume of water, is reduced by iron and obtains mixtures from naphthalaminesulphonic acids transformed into lime salts. By adding some chlorhydric acid to the solution, the naphthalaminesulphonic acid which is difficult of solution, might be isolated. Under the action of azotic acid, this last is transformed into a diazoic derivative, which must be added to a cold and maintained alkaline solution of naphthol.

COLORING MATTERS DERIVED FROM MONO AND DIAMIDANTHRACQUINONE.

(Patents of *Freybaur & Co.*)

The mono and diamidanthraquinone are heated by means of sulphuric acid, containing 40 per cent. of anhydrite. Some coloring matters are formed; heating longer their derivatives sulphonconjugate are obtained. The amidanthraquinone is prepared by reduction of nitric reductive, by means of ammonia and zinc powder, or by heating the nitrous body with very concentrated ammonia, under a pressure of 3 to 4 atmospheres.

The Emetic as a Tannin Fixer.

(Extract from Society Industrial of Mulhouse Committee's Book of Proceedings.)

Mr. Schaeffer gives an account as follows, of researches that he has made to discover the author of emetic employed as a fixer of tannin colorings.

The application of aniline coloring by means of tannic acid, took effect almost immediately with the appearance of those colorings. But the tannin was not yet tried on fibre, this one did not present then the solidity obtained by its passage through an emetic solution after a previous evaporation; this process is of very great importance and especially for methylene-blue application, now generally in use.

Mr. Camille Kocklin has proposed to once more investigate the source of so interesting a process. The researches made in this subject showed that it was to Mr. Thomas Brooks that the merit was due, of having been the first who fixed the tannin by means of an emetic passage, and put this process in practice for the Manchester Printed Calico Manufactory, which belongs to Messrs. Butteroth & Brooks.

We have under our eyes, the patent accorded to Mr. Thomas Brooks, dated March 20th, 1861, in which he specifies the nature of his invention as follows:

APPLICATION OF CERTAIN COLORING TO THE PRINTING OF COTTON TISSUES.

After printing at once garance, or garancine, by means of gallic acid thickened with Senegal gum, with some mordants, it must or it must not be oxidized and evaporized, then ungummed (in a mass formed with sodium silicate or phosphate, etc.) By subsequent operations, this process will fit the tissues for receiving at once, aniline coloring, garance or garancine.

In November 1861, *The London Journal of Arts* published the works of Mr. Thomas Brooks, and also those of Mr. Lloyd and R. Dale. Those two chemists proposed to fix the aniline coloring matters by printing them thickened with gum-water in addition to tannic acid, evaporizing and passing them through an emetic solution.

This process being in reality but an application of Thomas Brooks' invention, already patented in March 1861, the priority could not be contested.

The committee approving Mr. Schaeffer's conclusions will ask the Society to present a bronze medal to Mr. Brooks.

Process for the Manufacture of Pittacall.

This beautiful dye, which is also known under the names of Eupittonic acid, and corn-flower blue, according to R. Gottheil is obtained as follows:—That part of the oil of wood-tar which is heavier than water is repeatedly distilled and then heated with about 25 per cent. of alkali. After the indifferent oils have been separated, the hot alkaline solution is mixed with 25 per cent. of common salt. When cold the dimethyl-ethers of pyrogalllic acid separate out as a crystalline mass, which is then stirred up with five times its volume of a solution of soda containing 20 per cent. After the liquid has been heated to a boil, a current of air is forced through it till the liquid becomes entirely blue. The aqueous solution of the eupittonate of potash that is formed is filtered hot, and the acid is precipitated in the free state by the addition of muriatic acid. It is purified by repeated conversion of the acid into the soda salt, which is sparingly soluble in the cold, washing it in solution of common salt and reprecipitation.

KING COTTON REDIVIVUS.—Once again the hoary textile monarch of the South advances in all his pristine pride. In plain terms, the cotton crop this year is announced to be the largest since the war. This is something to rejoice over, for there at one time existed a fear, that slave-labor once abolished, cotton cultivation must needs languish. This fear is now most decidedly and very happily dispelled. We find the production, even under many difficulties of unseasonable weather, etc., is so large that fears are entertained by many planters that the consequence of this plethora will be a serious reduction in price. Such fears must be groundless, for surely the demand has grown quite as fully as the crop. The market is not at all likely to be overstocked, for cotton textiles are now more extensively manufactured than ever, and wool will continue, as of old, to admit it in combination where economy of production is the popular requirement.

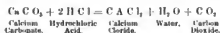
Application of Chemistry to Textile Art and Dyeing.

(Continued from page 187.)

COMPOUNDS OF CARBON WITH OXYGEN.

Carbonic Oxide is a gas having neither taste nor smell, formed by the imperfect combustion of carbon or coal. It burns with a bluish flame, which is frequently observed in stoves where the combustion is imperfect, acting as a poison on the human organism. When moderately present in the air it is productive of headaches, but if in large quantities it is fatal to life. Carbonic oxide may also be prepared by heating crystals of oxalic acid with concentrated sulphuric acid.

Carbon Dioxide, better known as Carbonic Acid C O_2 , is also a carbonaceous substance, burning in oxygen or in the air. It is likewise a product of respiration, fermentation, putrefaction and other processes. It occurs in the air, in many waters, and when combined with certain metals, especially calcium, it forms a considerable portion of the crust of the earth. It is prepared in the simplest manner, by treating calcium carbonates with hydrochloric acid:



In this reaction, carbon dioxide or carbonic acid (which is the more familiar name) is set free as a gas, and in escaping produces the phenomenon of boiling or effervescence, this being one of the characteristics by which it may be identified.

Nearly all effervescing substances, for instance, champagne, ale, beer, soda and mineral water, seltz and baking powders, etc., owe their peculiarity to the presence of carbonic acid. This gas possesses neither color nor smell, but has a very peculiar prickly taste. It is capable of being condensed to a liquid or a solid state. It is a very heavy gas and may be poured from one vessel into another downward like water. It will not burn nor support combustion. If a lighted candle be introduced it is instantly extinguished. When inhaled it is dangerous, as it produces a spasm of the glottis and brings on death by suffocation. In accidents from this cause, which are not infrequent in factories where fermentation is going on, the sufferer should be speedily removed to the fresh air and artificial respiration resorted to. As an atmosphere containing this gas is equally detrimental to life and injurious to combustion, a suspected locality may be readily tested by simply introducing a lighted candle, and if the light becomes dim then it is certain that the gas is present and the air there is unfit to breathe. It is not at once fatal, but it acts injuriously on the health and predisposes to death; and this is particularly the case in high temperatures, and hence the absolute necessity for thorough ventilation of crowded rooms, schools, churches, halls, etc. This gas is quite soluble in water, especially cold water, and it may be completely driven out of this solution by boiling. It forms true carbonic acid in conjunction with water:



Carbonic acid is one of the weakest of the acids, it reddens blue litmus paper, and combines with many metals to form salts. Both atoms of hydrogen in its formula may be replaced by metals, and it

is therefore a dibasic acid, forming two series of salts:

$\text{Na}_2 \text{H C O}_3$ —Sodium Bi-carbonate (Bi-carbonate of Soda,) and
 $\text{Na}_2 \text{C O}_3$ —Sodium Carbonate (Carbonate of Soda.)

Textile manufacturers and dyers have frequently to use the salts of this acid. All substances containing it effervesce in communication with other acids. The gas escaping has no peculiar odor. Clear lime water becomes turbid and of a milky appearance when shaken up with carbonic acid gas. The white substance thus formed is calcium carbonate (carbonate of lime.)

Carbon forms a considerable number of compounds with Hydrogen, but it is not necessary to allude to them in connection with the main subject of this journal, as they have little or nothing to do with it. In our next we will treat of the compounds of carbon and nitrogen.

(To be continued.)

(Expressly translated from the *Färber Zeitung*, for the *TEXTILE COLORIST*, by J. Frankel.)

The Application of the Azo Dyes, Orange, Ponceau, Bordeaux, etc.

BY DR. E. ALLRICH.

By means of the well known old methods of dyeing cochineal with a complicated tin-salt mordant, tolerably good results were obtained. The colors attained had the advantage not to rub off; but had the fault that they could not be maintained full. Another treatment consisted in simply mordanting the yarn in acetate of alumina, which was either free of acetate of lead, or contained an overplus thereof; thereby were obtained pretty, but too light colors, which moreover rub off too easily. By combination of the two methods a treatment was developed, which sufficed all claims with regard to beauty and durability of color. What part the tin takes in the series of mordants, as described below, is not explained. The necessity of employing the same for the dyeing of fine yarns, is the more surprising, since on ordinary yarns the same beautiful effect is reached, by applying basic sulphate of alumina. In the dyeing of jute the treatment is the same as in the case of ordinary cotton yarn.

At first sight, there can be nothing more simple than the dyeing of wool with the mentioned dye-stuffs; and yet its proper treatment demands the same subtlety and accuracy of method as the dyeing of cochineal, if the aim is to attain the greatest profit simultaneously with the finest effect. It is a well known fact, that few dyers are in a position to dye fine military cloth with cochineal, in the finest shades, and how great is the difference in these articles as regards purity and cast. Very similar is the situation of the dyeing with ponceaux and coccinins. It may be asserted that there are but few dyers who are able to dye these colors in their entire beauty. This originates from the fact, that we are accustomed in the dyeing of wool with aniline colors, to make very little ceremony; and also since the mentioned dye-stuffs may be fixed upon the fibres by the simplest means. We need, as already stated, only to decompose the dye-salt in the dyer's-bath by means of acids, or acidulated salts, boiled more or less, and the dyeing is done. In order to do still more, some alum or a solution of tin is here and there applied, besides the above, or instead of using a cheap acid, such as sulphuric acid, a more expensive one, as for instance oxalic acid may be ap-

plied, which moreover acts to greater disadvantage than the former. The variations of the so-called first boiling for ponceau-dyeing, reach an indefinite number. Each of them forms a recipe which the lucky inventor deems to be an especial good one; in the main part, they are however scarcely different from each other. Usually the better or worse effect of the one or the other depends not on this, but on the accidental quantity of the applied means, on the longer or shorter period of boiling, and in the main part on the fact how exhausted the bath becomes. As is known to every dyer, this moment is of particular importance; he knows that he can attain, with even comparatively inferior dye-stuffs, most beautiful results, if he manipulates so that the inferior part of it remains in the bath. By the extraordinary difference in price between the dyeing with ponceau and cochineal, the dyer was hitherto not constrained to reckon so close, as is in store for him sooner or later to do, and he will then vain take hold of a method, which besides a great economy in dye-stuffs and a complete using up of the material, will admit of the attainment of the most beautiful effect. This effect is reached by producing a chemical combination of the dyeing-acid with the base of the applied mordant upon the fibre.

The mordants which come under consideration for our purposes, are the salts of lead, alumina, chrome and tin. The former furnish indeed with the substances mentioned, combinations which are not easily soluble, but decompose in a simple manner with the dye-salts. The lakes are not pretty on the wool fibre; they are only applied in fixation for cotton prints, and only used in the fabrication of lakes. Of the tin combinations in use for mordants, it is but the so-called tin-solution, the nitromuriatic acid of tin, which is obtained by solution of tin in "aqua regia"; not that which is obtained by dissolving salt of tin in nitric acid. Bichloride of tin and tin-salt furnish no good results; pink-salt and stannate of soda, the latter combined with acids, are applicable, but offer for wool no advantage however, and come only in use for dyeing of loose cotton. Chromates have for the shading of bordeaux a certain importance, but of the greatest moment are the mordants of alumina. Their combinations with acetic dye-stuffs furnish lac-dyes, which greatly excel all others in beauty. In the wool-dyer's art, as has already been stated, salts of alumina are variously, but incorrectly applied. If by these dyeing processes, alumina is evenly precipitated upon the fibre, it is not combined with the dye-stuff to a fine lac-dye, and less so, when free acids are still present in the bath. Although the sulphate of alumina and alum, chemically considered, are neutral bodies, they work nevertheless in many cases like free acids; they cause the dyer's acid to become free, and have also the property of keeping the same in solution and to prevent their fixation upon the fibre, so that the same is dyed but faintly, if not, another acid is added. A smooth transposition of the dyer's acid salts with the sulphate of alumina, leads to a beautiful lac-dye, which dyes easily upon the wool fibre, occurs only when the same have been made basic by alkalis or alkali salts, or, in other words, when a part of their acid has become latent. The same is the case with the solution of tin, the surplus acid of the same must also be made latent, if the transposition is to ensue in the sense as indicated, and a really beautiful tin lac-dye is to be formed; and if not, in place thereof,

the crude dyer's acid with some separated oxyde of tin is to be fixed upon the fibre.

But the simplest method of attaining the desired effect is, if the wool is boiled some time in a special bath with alum or solution of tin, with or without an addition of cream of tartar, in the same manner as in the old process of dyeing with madder. Thereby it is covered, as is well known, with basic salts of alumina; the surplus acid remains in the bath, and the finishing is done by a second bath, which is to be thoroughly exhausted. But since this way is, as is self evident, too minute and circumstantial and moreover too expensive, a solution of basic sulphate of alumina is prepared and gradually added to the bath; or the necessary quantity of soda with the solution of dye-stuffs is first placed in the kettle, and adding the solution of the salt of alumina little by little, by a gradually increasing temperature. By the application of 6 per cent. of alum to the weight of the wool, and 2 per cent. of soda, good results are attained. By far better success is obtained however, if instead of soda, phosphate of soda, also an alkaline salt is employed. In the art of cotton-printing, and above all, in the Turkey-red dyeing, it is a sufficiently known fact, that the phosphate of alumina, as well as the arsenate of alumina, forms particularly pretty combinations with many dye-stuffs; and even if in the case here presented, it is not to be presumed that phosphate of alumina is present in an essential quantity in the lac-dye which is formed upon the fibre, it is nevertheless an indisputable fact, that the effect attained with phosphate of soda is much prettier than that which is obtained by the application of soda.

Of particular importance in the dyeing of wool, according to the treatment as described below, is the quantity of water. For the dyeing of cloth, flannel, etc., the proportion of about 30 liters of water for 1 kilo of goods, should not be exceeded. The use of dye-stuffs and mordant will be the less, the less water is applied for the dyer's bath.

We now proceed to elucidate the various methods of dyeing, and begin with the dyeing of

SHEEP'S WOOL.

We have thereby chiefly the treatment of cloth in view, the equalizing of which, as is known, causes for most colors, more difficulties than that of the yarns. It should be noticed right here, that felts are the most difficult articles to equalize, and if the aim is to produce really pretty colors on felts, it is best to commence operations entirely upon the cold way, and to increase the temperature even much more gradually than by the dyeing of cloth, and that an urging up to the boiling point is unnecessary in this case. The dyeing of the Turkish caps will be discussed more thoroughly. With regard to the dyeing of yarns, it may be mentioned, that they are treated in the same manner as the piece-goods, and that the same, when woven together with white and afterwards fulled must, immediately after the fulling is done, be washed and very well rinsed, and be directly dried without lying. The quantities of dye-stuffs which are applied for the dyeing of wool, differ according to the shading, from 1.2 per centum for scarlet and light amaranth, to 3 per centum for dark amaranth, and up to 5 per centum and more for reddish-brown colors. A very pretty and scarlet is attained with

1.5 per centum Ponceau R, a somewhat bluish-red with 1.5 per centum Ponceau RRR; a particularly pretty scarlet is obtained by a mixture of Ponceau G, extra with Cocineine. By the application of the latter it gives the cloth a very pretty blueish lustre, and the color itself becomes finer and livelier; if for instance a yellowish scarlet is produced by mixture of Orange G, Ponceau and Cocineine, instead of using one of the various Ponceau shades, which by itself corresponds to the desired shade.

A light pink-color is obtained with about 0.5 gr. Cocineine. If the same is desired to be a particular blueish tint, the double quantity of dye-stuff is to be applied, and only one-half is forced upon the fibre, while using a great deal less of alum or solution of tin than is directed by the recipe below.

Dark amaranth shades are best produced by a mixture of Cocineine, Ponceau and Bordeaux, for instance 1.85 per cent. Cocineine, 0.85 per cent. Ponceau RRR and 0.23 per cent. Bordeaux B. A pure Bordeaux is produced by 3 gr. Bordeaux B, a sad reddish-brown by 2.5 per cent. Ponceau R and 2.5 per cent. Bordeaux R. If a very dark genuine brown is to be produced, up to 10 gr. dye-stuff may be employed. It may be remarked, that 1 per cent. Bordeaux will have the same effect of color as 50 per cent. Orseille in paste, and that this Azo dye possesses the genuine property of madder, while the former, as is well known, is noted as a great "fugitive."

The new dyeing method, consisting in the application of phosphate of soda in combination with alumina, or mordant of tin, makes possible an absolute equalizing of the color, as well as the enhancing the beauty and intensity of the same. The economizing of dyes in the application of alum, amounts at least to 25 per cent; compared with the otherwise customary methods; by that of the tin solution it is somewhat less.

For dyeing, the operation is as follows: The article is in the first place wetted out in boiling water, then 4 per cent. phosphate of soda, of the weight of the wool, is dissolved with the necessary dye-stuff, and placed in the wooden vat, which is filled with water of a temperature of from 30 to 35° Celsius. Thereupon the articles are turned around and again rolled up. Thereupon 6 per cent. alum in soluble state is added, well stirred, and the goods are again entered. They are turned about for fifteen minutes, while maintaining the temperature as above given; and after the goods have been rolled up again, 2 to 4 per cent. dissolved alum is added, turning for another fifteen minutes, and now slowly admitting the steam, so that the bath begins to boil within the course of 30 minutes. This is kept up, according to the nature of the goods, for 10 to 15 minutes; or it may be taken out at the commencing of boiling.

If more water is used, as given above, the prescribed alum solution will scarcely suffice, and it will then become necessary to increase the same; the minimum of which, however, amounts always to double the weight of the phosphate of soda. By the application of the treatment as described, the success of which depends especially on the correct observance of the temperature, and the careful, slow heating to the boiling point, all stuffs can be well-dyed thoroughly. If however, the surface of the articles is merely to be dyed, instead of 6 per cent. of alum, 8 to 9 per cent. are at once

added, which heats up more rapidly for boiling. It is evident, that by a not thorough dyeing, a great saving of dye-stuff is attained.

The color obtains its beauty only by the reaching of the boiling point. If the shade obtained is too light, some more dye-solution, or perhaps 1 per cent. phosphate of soda is added; after the steam has been turned off, turn the goods for some minutes, adding the quantity of alum which corresponds to the phosphate of soda and again heat up to a boil. Of course prior to every addition the goods must be turned over.

Although it is advisable for the dyeing of fine and expensive goods to follow the above given directions accurately, and always dye in a fresh bath; the continuation of the dyeing process in the same bath is not precluded thereby, especially when dyeing such articles, as in regard to the equalizing, offer fewer difficulties. In this case a part of the warm dyers-bath is drawn off, and cold water substituted. If in the first bath 4 per cent. phosphate of soda has been used, perhaps but 3 per cent. is now taken with the corresponding quantity of alum, lessening this quantity at each successive bath.

(To be continued.)

In its "Answers to Correspondents," the *Chemical Review* of the present month has the following: "J. J. H.—To produce a scarlet on cotton yarn (11 lbs.) you may dissolve 6½ oz. tannin in hot water; steep the yarn over night, then dye with aniline orange and top with saffranine. Another process is, for 60 lbs. boil 3 lbs. of tannin; put down yarns in this over night, using for a mordant bowl-spirits (nitrate of tin), add 3 quarts. Wash off in two cold waters, and wring up. Dissolve 6 oz. aniline scarlet, and add to a warm water. Work yarns for an hour, 10 turns; wash in cold water."

A NEW FORMATION OF MALACHITE GREEN.—(By Otto Fischer).—If benzoic acid is allowed to act upon dimethylaniline in presence of dehydrating agents, the result, as the author has shown some years ago, is dimethylamidobenzophenone. But if anhydrous benzoic acid is heated gently with dimethylaniline and zinc chloride, the splendid hue of a green dye appears, in all probability, malachite green. This is already the fourth method of producing the dye in question.—*Berichte der Deutsch. Chem. Gesells.*

THE MANUFACTURE OF SULPHURIC ACID.—So intimately connected with the operations of dyeing is this useful article of commerce, that it may be interesting to the readers of the *TEXTILE COLORIST* to know that the method of manufacture adopted by Mr. A. Houné, a German Chemist, is as follows: He brings sulphuric acid, watery vapor and air in contact at high temperatures, but below redness, condensing the product in a series of stone-ware vases.

WANTS.

Manufacturers desiring help in any department, or persons wanting employment, can have their wants advertised in this column for the low rate of 50 cents per line. No other advertisement will be admitted in this department.

WANTED.—A situation, by a first-class practical plate-dyer on fancy numbers, wanted, knowledge, business, etc.; also on fancy hosiery. Has thorough knowledge of blue dyeing, both on wool and silk, patch dye, and paint indigo. Best of references. Address, R. F. V., care of *TEXTILE COLORIST*, 504 Arch St., Philadelphia, Pa.

WANTED.—A first-class dyer will be seen in an engagement on the first of August. Thoroughly understands the dyeing of cotton and wool and woaden pieces. First-class references. Address, F. B., care of *TEXTILE COLORIST*, 504 Arch St., Philadelphia, Pa.

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PATENTED.

FOR WOOL.

FAST TO LIGHT, FULLING AND STEAMING.

RECIPES BY WHICH THE ANNEXED SAMPLES WERE DYED:

RED.—100 lbs. of clean Wool are mordanted with 24 lbs. Alum and 6 lbs. Gray Tartar. Boil slowly for 2 hours; steep for 12 hours; lay aside for 24 hours.

No. 1.—4 lbs. Sumac,
1½ lb. Flavins,
2 lbs. Chalk.
Boil for 30 minutes, cool the liquor down to 100° F.

Then add 3 lbs. Art. Alizarine, W. Y. Retor the wool, raise the heat to a boil in 1 hour, boil for ½ hour, let steep for 2 to 4 hours before drawing off the liquor.

No. 2.—Mordant as above and dye with 8 lbs. Sumac,
2 " Chalk,
10 " Art. Alizarine, W. Y.

MAROON.—100 lbs. of clean Wool are mordanted with 1½ lbs. Bi-chromate of Potash and 2 lbs. Red Tartar, boil for 2 hours.

No. 5.—10 lbs. Art. Alizarine, W. Y.
6 lbs. Sumac,
2 lbs. Chalk.

No. 3.—Same proportions as for No. 2, using W. Art. Alizarine instead of W. Y.

No. 4.—Same proportions as for No. 2, using W. B. Art. Alizarine instead of W. Y.

No. 6.—Same proportions as for No. 5, adding 5 lbs. Extract of Fustic.

BROWN.—100 lbs of clean Wool are mordanted with 3 lbs. Bi chromate of Potash, and ½ lb. Sulphate of Copper. Boil for 1½ hours.

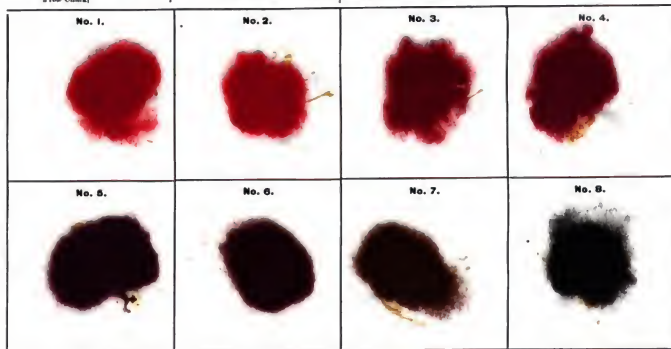
No. 7.—5 lbs. Art. Alizarine, W. Y.
5 " Extract of Fustic,
5 " Sumac.

Boil for 1½ hours, add with 2 " Sulphate of Iron.
Boil for ½ hour; steep 4 hours.

BLACK.—100 lbs. of clean Wool are mordanted with 12 lbs. Sulphate of Iron, 4 lbs. Sulphate of Copper and 4 lbs. Red Tartar.

No. 8.—7 lbs. Art. Alizarine, W. Y.
44 " Logwood,
6 " Fustic,
8 " Sumac,
3 " Chalk.

Boil for 1½ hours; steep 2 hours.



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TEXTILE COLORIST.

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On Calico Printing.

BY H. R. M. HASENCLEVER.

(Continued from page 179.)

Garancine and garanceux, the preparations of which were previously described, give in some respect similar colors as obtained from madder, but the colors of garancine have a cleaner appearance than those of madder.

On account of the soluble coloring matters which have been taken out from the madder in the process of manufacturing garancine, the white places on the printed and dyed goods appear brighter, and a bleaching and soaping after dyeing is therefore not required in such a degree as with madder colors. This is very valuable, because garancine colors do not stand very much soaping, wherefore the shades cannot be gotten up in such a bright state as with madder.

Several garancine shades cannot be received by madder, *i. e.*, black and dark chocolates. It takes a very large quantity of madder to produce even a very light shade of chocolate similar to chestnut, whilst half the quantity of good prepared garancine will yield a very nice chocolate.

Another very valuable property of garancine is that it can be used together with other dye-stuffs, and in fact, very nice shades are dyed in combination with cheaper coloring substances, although in most cases they will lose in fastness.

The principal colors for which garancine is used are black, chocolate, brown and red, the two first ones being more applied than brown and red. The mordant for garancine is generally iron liquor and red liquor, or a mixture of both. The strength and the quantity of the mordant regulates the shade and even influences the color considerably. Iron liquor of 1 to 4° Tw. produces a purple, whilst the same liquor of 8 to 12° Tw. gives a deep black.

Red is produced by mordanting with red liquor, with sometimes the addition of tin crystals. Both mordants, iron liquor and red liquor, applied together, produce a chocolate, and every shade may be obtained by changing the proportions of these two mordants. The darkest will be obtained by using equal parts of iron and red liquor at 12° Tw. Any lighter shades are effected by increasing the quantity of red liquor, and decreasing the iron liquor. By addition of catechu several more shades can be obtained, according to the nature of the mordant which is used. Catechu with iron mordants gives a drab color, whilst, when red liquor is used, a brown color is produced. These mordants are thickened in the same manner as before mentioned, and if the mixture is too light, a sightening substance is added. For black they generally use logwood, and for reds, chocolates, browns, etc., peachwood liquor. This is done to give the printer more of a chance to work the machine better, and to overlook the pattern easier.

The printed goods are well aged and then washed in order to

free them from any excess of mordant and from the thickening matter. This cleansing can be done in several ways, the usual method is to run the pieces through a bath of arseniate of soda and sal-ammonia liquor; also often with addition of silicate of soda. The bath is used hot in order to effect a perfect washing, which is of great importance for these colors, as the dye-bath will not work well if any free mordant comes in contact with the coloring matter.

When the goods are perfectly washed and cleansed, they enter the dye-bath in the same way as mentioned for madder colors. The quantity of garancine to be taken for a certain number of pieces depends on the depth of the color which is required, and it has to be left entirely to the dyer, who, with his practical experience, knows pretty near how much garancine has to be used to produce a certain strength of color. Of course it depends also much on the quality of the garancine; the better this is, the less has to be taken. As a general rule it is best, to procure always the very finest market article, and not look too much on the price, if these do not differ too much in the different qualities. The finer the dyeing substances, the better the result.

The necessary quantity of garancine is put in the sufficient quantity of water and heated up to 100° F. At this temperature, the cloth is entered and the heat increased gradually to 170° F., where it is kept for some time, and it is generally kept at this temperature until the process is almost finished. The heat is then increased to 200°, and at last to boiling, where it is only kept for a short time, and the dyeing is finished. The goods are taken out of the dye-bath to be cleared, which means, to brighten the white places in the pattern, which possibly might have obtained a slightly colored appearance. The first bath which is applied, is the brau bath, the temperature of which should not be over 140° F. The goods then pass through a very dilute solution of bleaching powder in a similar way as with madder styles. Another way of clearing has been much used. This is the padding of the pieces with a solution of bleaching powder of 1° Tw., and then running the goods through a steam-box, where they are in contact with steam for several minutes. From this cleansing, the goods are brought into the washing machine; from there to the centrifugal hydro extractor; and then to the finishing department, where they receive the final treatment and are made ready for the market. The operations of finishing have been described before, and although some difference may exist between print goods and madder goods, the operations in the principal points are the same.

Since the invention of the artificial alizarine, the madder dye works had to change their ways considerably. The use of madder has decreased in an enormous manner, and works where several tons were used daily, now use hardly one ton within a week; and there is no doubt that after some years the use of madder will almost cease entirely. In European countries the greater part of the madder works have stopped operations, and alizarine dyeing and printing

have taken their places. They have not reached this point in this country yet, but it is sure that within a few years the use of madder will be reduced to almost nothing.

The working with alizarine is very similar to that of madder, but the result is not yet the same. We are able to obtain styles very similar to those from madder and garancine, but it is a fact, that most of the alizarine colors do not stand as high in the eyes of the colorist, as the best madder colors. The advantages however, are very important; the working is easier and the cost far below the madder colors.

For further description of alizarine and its use in practice, I refer to the article in this paper of 1879: "The History of Alizarine and Allied Coloring Matters and their Production from Coal Tar" and to several other articles given in this years volume.

Chlorozone Improved in America.

BY E. L. F.

Being the first to bring to light the advantageous principles of Chlorazone as a new bleaching chemical, the TEXTILE COLORIST takes a certain interest in its development and thinks it useful to follow up its progress in the textile industries. From reliable information on the effect and results of this article, recently improved in a remarkable degree here, it appears that it really supercedes chloride of lime in quality and economy, especially on goods of a certain value, such as calico, spool-thread, hosiery, fine twine, sheet-thread, linen fabrics, jute goods, &c.

The total absence of deterioration in the texture, even the most delicate—when properly handled—is an established fact. It is also admitted that the printing and dyeing applied on fabrics thus bleached, acquire a positive superiority in brightness and fastness. The finishing of the goods seems also to gain by it some decided advantages, from the fact that one of the characteristics of chlorazone is to impart softness and gloss to the fibre.

The suppression of acids is another good point in favor of the improved article. Every manufacturer suffers more or less directly from the latent destructiveness and oxidation left in goods treated by chloride of lime and acid. This reform contains in itself an important item of economy, not only in the corrosive material itself, but in the subsequent handlings and washings it necessitates. Considering also the cost, inconvenience and labor, rooms and utensils required by the use of chloride of lime with acids, compared with the easy, simple and clean process of chlorazone in carbonyl, there must be notable savings all over, besides the plus-value of the superior results. On the face of the facts known by new experiments there seems to be no doubt in the ultimate adoption of this new method over the old and crude process of bleaching by a direct contact with lime and acid.

The principles from which chlorazone is produced are scientifically correct and chemically true. Ozone, as everybody can verify in any dictionary or chemistry book, is an essential part of the natural oxygen acting on the globe as a providential purifier and bleacher. It bleaches, naturally vegetable, color and discolors dyed goods exposed to the air in combination with the sun's rays.

It converts indigo into a colorless isatin. This fact permits

any one to verify the identity of chlorazone as a genuine product. A drop of chlorazone on a drop of indigo solution will turn this colorless. Another fact proving that it has no relation with chloride of lime, is that soap will amalgamate with chlorazone, while it will not with chloride of lime, which curdles and decomposes it in granulation. In this respect, a new application of chlorazone is going on in New York. Laundries and families are using it to wash and bleach at the same time, *in cold water and without soap*.

While European scientists generally keep their discoveries in the inaccessible spheres of high sciences, American chemists bring theirs down to popular utilization and benefits. This practical and sensible method is receiving a new application by chlorazone, which is making its way in industries and households of all classes of America, by turning it into individual uses. It washes clothes faster and cheaper than any soap known, and acts most beneficially as a disinfectant and purifier of the atmosphere in houses, without the inconvenience of an offensive smell, as carbolic acid or lime.

There are several methods of forming ozone; one of the easiest consists in transmitting a succession of electric sparks into dry oxygen. It is so produced in Europe for medical uses, especially in cases of epidemic diseases, cholera, malarial fever and other affections produced by foulness of the air. It has been observed that yellow fever is due to an insufficiency of ozone in the atmosphere during the fermenting heat of summer. Therefore, factories and houses may be sanitarily benefited by the use of chlorazone.

The great difficulty of producing ozone in a tangible and cheap form has been removed by the patented process on which is based the manufacture of chlorazone. The principle of this production at a cheap cost, rests on the fact that the ozone of nature has a great affinity with certain oxygenated gas. This being generated in combination with a current of air, the ozone is absorbed and incorporated in a prepared solution, which keeps it stable until it comes in contact with any vegetable material, on which it precipitates with an extraordinary energy. This remarkable scientific fact is accomplished through a perfect but complicated system of generators, retorts, purifiers and condensers, working successfully in New York after long and expensive studies, besides the price of \$30,000 paid for the original patent.

Dyeing as Chemically Considered.

BY PROF. J. F. KILSON.

It is proposed in this, and some articles to follow, to consider the theories and principles governing the great and growing industry of coloring. I am fully aware that to do this I lay myself liable to a prolonged trial before the bar of public opinion, and, perchance, popular prejudice; nevertheless, it is no worse for me than for other more eminent chemical investigators who have achieved great results and written them only after years of patient toil and trying ordeals. All honor then to such and every scientist who has achieved success, however limited, notwithstanding the much which yet remains untold.

In view of this, I will consider briefly such particular

cases of dyeing as can be gleaned from the most reliable sources; after which the attempt made to construct a general theory will be considered.

The simplest cases of coloring then, are those in which only two substances are employed, viz: the fibre to be colored or dyed and the coloring matter—the latter an aggregation of certain constituent elements to be separately considered in the future—and when the process consists merely in leaving the two substances in contact for a certain period, at a convenient temperature. Of *natural* coloring matters, few can be practically used in this simple way, for reasons well known to practical men, without some previous chemical treatment. All who have paid the least attention to the action of reagents know that before we can reasonably look for a combination of any two elements that united form a third, there must be an affinity existing, else, instead of union, separation will ensue. This principle applies, with all its force, to the process of dyeing fabrics; for, viewed in the light of chemical discoveries, when the constituent elements composing the liquor used for coloring come in contact with the submerged fabric, chemical forces are brought to bear, and these constituents, held together in solution, separate and unite with the elements composing the cloth, or whatever substance is being colored. Again, the color of the first combination often undergoes an entire change; but this apparent phenomenon will be considered in the future.

Among the artificial coloring matters derived from auline, one of the compounds of cynnogen (heretofore considered) illustrates the foregoing department of dyeing sufficiently well for all practical purposes to obtain the finest shades of mauve, magenta, purple, and numerous other colors upon wool and silk fibre, the whole process consists in merely sufficient quantity to produce the desired shade; in this process the fibre possesses certain absorbing qualities which have the power of extracting all the coloring matter from the solution, rendering the liquor nearly colorless, acting as it does upon the very same principle of a popular water-filterer which renders impure water suitable for culinary or drinking purposes.

During this process of dyeing, the fibrous material is necessarily kept moving, so that the coloring matter may have access to all its parts alike, or nearly so. It may seem at first sight that the principle of capillary attraction would accomplish the same results; but, it should be constantly borne in mind, that when a liquor passes through a fabric, or is forced through by this process, the principle of filtration is again acting; hence, the further the journey of the liquor the nearer it becomes to those constituent elements for which certain portions of the fabric have an affinity, the extent of which affinity (if I may be allowed the expression) regulates

the extent to which the coloring matter will adhere to the fibre—a fact denominated by dealers “fast colors,” for the matter thus used enters into the combination, becoming part and particle of the fabric itself. It should not be understood that the auline colors are the only ones that act in the manner described, for I only used it as an illustration, as many of the older artificial colors act in a similar manner: for instance, those who have used sulphindizotic acid, picric acid and two or three others, have noticed the existence of the same property of firm union with the fibre of wool and silk.

There are other cases of dyeing which closely resemble those in which the resulting dyed fabric may be considered as a binary compound of fibre and coloring matter, but in which the methods of application are less simple. “These,” says a late competent authority, “may be considered as consisting, generally, in the use of materials or processes, which bring a previously insoluble coloring matter into a soluble state: thus the pink colors of safflowers are obtained.” Taking this argument as conclusive evidence, by the action of an alkali the dyes yielded by archil, annatto and indigo are also the result of the action of solvents.

I am inclined to the opinion, formed after considerable investigation, experiment and observation among practical dyers, that it is not impossible (in fact, it is probable) that during the process of solution important and unseen changes take place in the formation of these dyes; but, if so, they are only of a temporary nature, for there is no reason to suppose that the coloring matter attached to the fibre differs in chemical composition from that which is free, nevertheless I do not give this as an absolute and incontrovertible fact, in as much as, so far I have been unable to demonstrate it as a certainty. I only reason from an analogical standpoint, and if anyone has succeeded in determining its truth or falsity I hope they will make their knowledge known, so that the mistake, if such exists, may be corrected.

In conclusion, before I consider coloring matters separately, I wish to state that in nearly all other coloring matters the above processes are quite powerless to induce a permanent combination with the fibre. Let wool or silk be immersed at boiling temperature in a decoction of any of the best-known natural dye-stuffs such as cochineal, logwood, madder, quercitron bark, etc., and then washed in water, it will be found that the fibres are simply discolored or stained of no definite shade, they having taken up but a small portion of the color from the decoction, no real dyeing having taken place.

In my next I will consider “The Use of Mordants.”

THE azo colors, for printing on woollen tissues, merely require to be thickened. If any of them, Bordeaux, for example, proves inclined to gelatinize, a little red liquor, or sugar of lead, is added before thickening.

On Resists in Printing.

The resist or reserve style had a great run some years ago, and now the caprices of fashion seem again about to give it a certain importance. This determines us to publish the methods which are at present in use for producing goods in this style.

By resists we understand certain preparations which are applied either mechanically or by hand upon certain portions of pieces to preserve them from the action of the color becks in which they are dyed, as if the intention was to obtain a uniform shade over the whole piece. All the parts where the reserve or resist has been applied remain white, or, while the rest of the piece is colored, producing thus, for instance, white circles or squares on a black ground.

Hence it will be understood that the resist may be either *chemical*, i.e., when the substances which enter into its composition decompose the wares in the dye beck, and thus hinder them from becoming fixed at the point of contact; or *mechanical*, as is generally the case in printing handkerchiefs. In this latter case it acts simply by hindering the tissues from becoming wetted at the parts where it is applied, as it does not allow the dye liquors to penetrate. Consequently the fixation of the coloring matter is prevented.

We may also dye a piece uniformly at the outset, and afterwards remove the color in any desired part by means of substances appropriate to each kind. In this case the mixture printed on always acts chemically, and is known as a discharge.

There is still another kind of reserves known as resists. Here the resist is first printed on, and then some color is printed over it, which does not take on where the resist has been applied. [This distinction between reserves and resists is not made in this country. Any preparation printed upon a white ground, in order to protect it in parts from a color to be applied subsequently, is here called a resist. But if the ground is already colored, and certain parts of it are to be protected from further colors, the mixture printed on for that purpose is generally known as a paste.] This style is only used for handkerchiefs.

Since the almost general adoption of the aniline colors, chemical reserves and discharges have been almost abandoned at Lyons, where only silks and mixed pieces are printed. But they have still a great importance in the works of Mulhouse and Rouen, which merely operate upon cotton tissues, and where their judicious use renders it possible to produce those splendid prints which daily excite admiration, especially among connoisseurs, who can appreciate the difficulties overcome by the skillful chemists of the Alsacian and Rouennese establishments.

We shall only occupy ourselves here with the mechanical reserves—the only ones used for our class of goods—and we shall treat in succession of white and of colored reserves.

We shall then say a few words on resists and discharges.

White Reserves.

Many substances have been tried hitherto as mechanical reserves; but the only ones whose employment has become general are the resins, especially common resin (colophony), rendered less brittle by the addition of various fatty matters, such as yellow wax, tallow, spermaceti, &c.

Resin acts admirably, and is not at all penetrated by the color-

ing matter; but if used alone it has the bad property, when dry, of splitting off, which would enable the whites to be soiled. This difficulty is overcome by mixing it with fatty matter. The color thus prepared would be too hard and consistent, and could not be worked even if hot. The necessary degree of fluidity to admit of printing is therefore given by further mixture with solvents, such as oil of turpentine and alcohol.

A reserve to give good results should adhere well to the block without clogging it too much. It should adhere perfectly to the tissue and penetrate well, and be itself impenetrable to the dye liquors. Lastly, it should admit of easy removal from the goods without injuring the dye of the ground. The following reserves, the one thin and the other thick, answer all these conditions:—

	Thin Reserve.	Thick Reserve.
Resin.....	17½ lbs.	17½ lbs.
Yellow wax.....	14 ozs.	14 ozs.
Spermaceti.....	17½ ozs.	17½ ozs.
Tallow.....	14 ozs.	14 ozs.
Oil of turpentine.....	24 pints.	9½ pints.
Alcohol.....	3½ pints.	1½ pints.

The tatty matter and the resin are melted together, and the turpentine is then added, and afterwards, when the mixture begins to cool about 140° F., the alcohol is gradually incorporated. If the materials are melted over an open fire, care must be taken to remove the pot from the furnace before adding the turpentine, to avoid ignition, and possibly explosion.

The reserve is then printed upon the pieces, simply rinsed after being ungummed. [It will be understood that the author is speaking of silk goods.] The printing requires a certain amount of skill on the part of the workman, in order to put enough of the reserve on the pieces required, and he has sometimes to re-apply it three or four times, according to the nature of the design. But we need not enter into the details of this operation, which is quite outside our especial purpose.

The piece, when printed, is dusted over with earth of sommieres, which prevents the parts not printed from being touched by those that are. It is then necessary to wait till the reserves are sufficiently dried to bear dyeing.

The process requires no remarks further than that it must be done in the cold, and slowly, to ensure evenness. Blacks and maroons are got up with the woods; colors with all the dyes insoluble in benzine, that is to say, almost all the colors derived from aniline.

The next step is to clear away the resist from the parts to which it has been applied, in order that the white design may appear distinctly upon the colored ground. For this purpose two sorts of solvents are used; the one kind are alkalies which act chemically upon the resinous and fatty matters, saponifying them, if this term may be used concerning resins. Such are soaps, alkaline carbonates, and caustic soda. They are applied at a hand heat, especially soap, either alone or mixed with a little of the alkalies above mentioned, for blacks and maroons. In this case the pieces on leaving the dyehath are passed at once into the alkaline bath until the resist is removed. It is then only necessary to rinse and dry the pieces.

But if the goods have been dyed with aniline colors, these alkaline solvents cannot be used, as they would in part destroy the

shades. It is, therefore, necessary to make use of another process. Certain neutral solvents are used which remove the resins and fatty matter without having any action upon the aniline colors. Among these solvents are benzine, light petroleum oil, &c. In this case the pieces, after dyeing, are dried and steeped in benzine, which is mixed with a larger or smaller proportion of petroleum for the sake of economy. Two successive steepings in this solvent are necessary.

The next step is to whizz the pieces carefully, so as to collect the benzine, which is then rectified, so as to free it from the resist, when it may be used again.

We may add that M. Luthringer has patented a process for obtaining very fine impressions by means of the cylinder machine. This process consists in adding tarry matters to the substances above mentioned. The printing is done hot, and sulphuret of carbon is afterwards used for removing the reserve.

Such, then, are the processes at present in use in the works of this district for white designs upon colored grounds. But this is not the limit of the styles which are executed. Thus, if we wish to obtain light blue spots upon an indigo ground, or red spots on a black ground, we first dye the pieces uniformly a light blue or a red, and print on the white reserve. Then we dye the piece again either in the vat or a black, and finally clear away the resist. But this removal of the resist has always to be done with benzine, for alkaline solvents deteriorate the first dye.

This last style can only be executed when the first dye is not incompatible with the intended color of the ground. Thus, if we wish to obtain a green spot on a red ground it would be impossible to dye the red without having previously destroyed the green in the parts not covered by the resist. It is still possible to effect this end, though never without great difficulties. The first dye is destroyed by means of permanganate of potash, followed by sulphurous acid, or by aqua-regia more or less dilute. The last process is the most common and the least dangerous to the tissue, but it is not perfect.

In order to produce the latter styles colored resists have become necessary—that is, such as leave various coloring matters on the tissue at the places where they are applied.

On Colored Reserves.

We ought to say, before going any further, that this still would have a great success if it could be produced in a truly practical manner. Unfortunately this point has not yet been reached, and good results are only obtained upon dark grounds, for reasons which we shall presently see. Nevertheless the effects obtained are very beautiful, including, for instance, spots of different colors at the same time upon a black ground.

The mixture of the resist presents certain difficulties as regards the incorporation of the color, which always belongs to the coal-tar group. The following is the best means of overcoming this difficulty: A white reserve is made as laid down above, but with the omission of the alcohol. When the mixture is almost cold the color, dissolved in the smallest possible quantity of alcohol, is gradually introduced, with constant stirring. The following coloring matters may be used, always selecting the kinds soluble in alcohol and not in water:—Naphthaline yellow (Martius yellow),

yellow coralline, phosphine, Hoffmann's violet, magenta, saffranine, spirit blue, methyl green, &c. Intermediate shades may be obtained by mixing.

These colors are then printed on like the ordinary white reserves; the pieces are dyed when sufficiently dry, and the question now is to fix the coloring matters contained in the reserves; for if they were dissolved off with benzine before fixing, the spots would remain white and scarcely colored. This fixing process presents much difficulty, and is almost impossible when the grounds are not dark. In fact, the pieces are placed in tanks and exposed to the influence of steam for at least ten minutes, as is done in ordinary steam styles. It will be understood that, under the influence of a high temperature, the resinous and fatty matters of the reserve melt by degrees, and, losing their firm consistence, become fluid, spreading over the piece and carrying with them the coloring matters with which they have been incorporated. The design then loses its sharpness, and the outlines are indistinct. If the ground is black this running is not perceptible, and the style is practicable; but upon a ground of a light color—a sky blue, for instance—it is easy to imagine the effect that would be produced. This difficulty of fixation has not been overcome in a cheap manner hitherto. The sole remedy proposed consists in steeping the piece before fixing in a solution of gum, which, when once dry, keeps the resists from flowing over the grounds. This expedient is costly, and, besides, the grounds are never as bright.

It would be a desideratum to obtain reserved colors which would fix in the cold; but as this has not yet been done, the colored reserve style is practicable only upon black or very dark grounds.

On Resists.

[The term being used in the French sense, as above explained, in contradistinction to reserves.]

We have little to say concerning resists, for their number, as applicable to silk handkerchiefs, is very limited. We only know a single process which has given some results with the aniline colors. It was proposed by M. Durand, of Bale, and consists in mixing with gum-water at least 21 oz. per 11 pints of metallic zinc, or better, of tin, in an impalpable powder. The addition of bisulphite of soda to the color gives better results. The resist is printed on, and when it is dry the aniline colors upon which it is desired to leave whites are printed also. When dry the pieces are steamed for at least thirty minutes. Under the influence of steam the metallic powders act by their reducing property upon the aniline colors, and convert them into the corresponding leuk anilines, which are white.

Unfortunately it often happens that after the lapse of a certain time the color of the ground gradually reappears in consequence of a slow oxidation. Moreover, these colors have the defect of coating the printing blocks too much, which makes it difficult to obtain delicate designs.

Almost all the aniline colors can be thus decolorized, with the exception of a few, such as phosphine and saffranine, which are not attacked. It will, therefore, be understood that they can be added in mixing resist colors, which will then give yellow and red resists.

These same color-resists may be employed as discharges upon pieces dyed uniformly with aniline colors. The color is printed on,

fired by steaming, washed, and the parts touched by the discharge become white. This process does not give perfect results.

Upon black and maroon grounds got up with the woods, the resists and discharges do not give good results for silks. It has been said, nevertheless, that the alkaline phosphates, and especially the silicates, have been to some extent successful as resists (?).

We have indicated nearly all the processes used in silk printing.—*Textile de Lyon.*

On Ostrich Feather Dyeing.

BY PAUL ALEX, PRACTICAL FEATHER DYER
(Continued from page 175.)

Eight or ten years ago if a practical feather dyer made three or four colors per day, it was considered to be a good day's work, for at that time the nature of feathers was not understood; nor were they used as extensively as at the present time. It was very rarely you could see the rich shades that are now noticeable in our store-windows. The colors then most frequently produced were *blues, browns, greens and blacks*. These were very rarely made to match samples—every color had, as a rule, a certain receipt by which it was to be made, without which receipt the dyer was wholly unable to produce the color. In fact there was altogether too much system. Everything was done by weights and measures. Judgment was almost useless when a dyer got a receipt in his possession, for these were deemed all that was necessary. Accordingly a bath was mixed as directed, and the result was always the same. Out of perhaps two or three hundred feathers entered, there would not be two dozen of one color, and why? Because the nature of the feathers is not the same. It is therefore necessary to understand the nature of the goods you are working. There is an old saying and a wise one too, that what is sauce for the goose is sauce for the gander, but the bath that will produce the desired shade on a female will not effect that same shade on the male bird. So that here is an exception to the rule laid down by the old proverb. In making white, for example, it would be absurd to enter male or Cape female, Egypt, tame and boozie. (And here let me say, by way of parenthesis, this last word is *boozie* not 'brunze', as printed in your last issue). In the same bath tame or Cape goods as they are generally called, are the easiest to produce a good white, or any light color on; boozie, especially Egyptian, are the hardest, as they are generally of a color bordering on Bismark brown when brought into the market; however, the color is not natural, being merely a stain which it is necessary to remove entirely, before they can be made a good white. They are generally of a very good quality, and when a good white is put on them they command a good price. But few, however, understand how to remove the stain, consequently they are mostly used for dark colors; and even in making them in dark colors it requires considerable care, as the bottom or foot of the feather is soft and white, while the top or head is four or five shades darker. They must be evened off accordingly before entering the bath. Even after the stain is removed, should you desire to make them light colors, such as pinks, blues, lavenders, or any color where a yellow tinge is not called for, it is well to use such dyes as require no acids of any kind, as they have a tendency to draw up

the yellow stain. But when creams, Tillul Eeru, and such colors are produced, acid can be freely used, picric excepted. I would not feel justified at present, in giving the receipt for the extraction of the stain, but will undoubtedly do so on some future occasion.

White tames or Capes require very little preparation previous to entering the white bath; in fact, they require but a few good washings—the first in luke-warm water to your mind—then a thorough rinsing. Very great care must be taken in the manipulation, to have them rubbed or brushed well, to expand the flue before adding the colors.

(To be continued.)

Cutch.

This is identical with *Cutechu* and *Terra Japonica*; it is a dye-stuff derived from the juices of certain trees evaporated down to dryness. There are several varieties, the difference being in the particular tree from whence the juice is extracted, the locality where the tree grows, the mode of preparation, and the amount of care taken in the production.

Cutch is made up for market in bales or large blocks, two or three cwt. each; or in round cakes weighing from 8 to 16 lbs. of a color varying from brown to black; in roundish lumps like a flattened orange, 2 to 3 lbs. in weight. Its texture is resinous and brittle when good. The color when broken is a brownish cream inside. If it has deteriorated in quality from any cause, such as age or exposure to moisture, it will present a deep brown color throughout, also being so sticky as to adhere to the spatula like pitch. It ought to contain half its weight of tannin, varying from 36 to 56 per cent. The tannin of *cutch* is not exactly identical with that of the gall-nut. Instead of a blue-black it presents a greenish-black or olive precipitate, with the per salts of iron, and with solutions of the tartrate of antimony and potash, forms no sediment. It is more soluble in water or alcohol than tannin in its normal state. *Cutch* besides tannin, contains *catechin* or *catechuic acid*, which plays a considerable part in its reactions. This body when pure forms white silky crystalline needles, slightly soluble in cold, but readily in hot water. If its solutions are exposed to the air they gradually pass into a mixture of rubinic and japonic acids. *Cutch* if genuine, is readily soluble in hot water. The brown solution, when cold, precipitates a sediment containing the bulk of the catechuic acid. Cold water will not entirely dissolve *cutch* unless that dye-stuff has been subject to exposure in a damp place or when it is aged.

Acids brighten a solution of *cutch*, while alkalies darken it. Olive-green precipitates are produced by per salts of iron, a more brownish shade is found after proto-salts of iron. Salts of tin precipitates are yellowish, and salts of lead dull reddish. Bichromate of potash and salts of copper, give down brown precipitates.

Cutch with nitric acid, yields a modified picric acid, dyeing shades resembling those obtained from turmeric. *Cutch*, besides being naturally various in quality, is liable to deterioration from time and neglect, and frequently adulterated with clay, sand, ochre, etc. It is very easy to detect these impurities. Boil the sample, strain it dry and weigh.

Cutch is very useful and highly important in a great variety of applications to dyeing and printing, entering as it does into a great

variety of compound colors, such as olives, dark greens, drabs, fawns, browns, and blacks, imparting to all a high degree of permanence. With madder and garancine in combination, *cutch* is abundantly used. It cannot serve like the ordinary forms of tannin as a mordant for fixing light or bright colors upon cotton, since it imparts a yellowish-brown color to the fibre.

(Translated expressly for the TEXTILE COLORIST by J. Frankel.)

The Means of Finishing Textiles.

BY DR. H. GROTHE, FÜR. D. A. POLYTECHNISCHE ZEITUNG.

(Continued from page 187.)

Pea and bean flour have been variously recommended¹ as means for finishing, as is also the starch extracted therefrom, which swells much faster and larger than wheat starch.

Sago-flour from the pith of the Sago-palm (*sagus Rumphii*² and *Sagus levis*) is much used for application of a finer sort of finish, since the starch contained therein, when boiled in water, furnishes a dense stiff paste of excellent application.

Tapioca is a flour gained from the manihot or cassava roots (*Jatropha manihot*) especially indigenous to Brazil, and contains a large amount of starch. Its application for finishing however, is but sporadic, and up to our time still insignificant. Sago and Tapioca³ may already be counted as starch substances, although they do not always appear so free of azotic admixtures, as may be expected of starch.

The most ancient source for the manufacture of starch we find in Pliny, who ascribes its fabrication to the inhabitants of the island of Chios. The first application of it for textile fabrics—according to the institution of Menau—took place about 800 before Christ. The starching of cloth (linen) was invented by Mrs. Dingham, a Dutch woman, the wife of the coachman of Queen Elizabeth, in 1560. Mrs. D. charged £5 admission for those who desired to observe the process of starching, and £1 for seeing her manufacture the starch. 260 years later Beau Brummel made his appearance, in his celebrated starched cravats.

If we now begin to investigate the subject of starches,⁴ we meet in the first place the wheat flour starch. We have already stated above, that wheat starch⁵ in the first place on account of its composition and by dint of the absence of azotic ingredients, is less inclined to the formation of fungi. This fact however, is by no means very far-reaching, since experience has proved that stuffs which had been finished with such starch have produced rapidly and powerful fungi. The question has even been raised by certain parties, whether the frequent occurrence of mould formation upon cotton goods, simultaneous with the frequent application of starch for finishing, might be attributed to the use of starch? If the cir-

cumstance is considered, that most of the appliances for finishing contain artificially added fats, the absence of azotic matters in the starch for the finishing mixture, is of little moment. Its colorless condition and its ability to form a stiff paste with boiling water, speaks in favor of applying starch, which is a very agreeable means of finishing. The commercial wheat starch varies often in its composition; the contents of starch varies between 78 and 85 per cent., especially in consequence of the fluctuating contents of water, but also in consequence of dishonest admixtures.⁶ Of a local importance are the starches manufactured of *Sperl* (*Triticum spelta*), the so-called "spelt starches" in Württemberg (Germany). Rice starch⁷ is used more frequently for finishing as is generally known. It does not of course serve for the finishing of the raw cotton cloth in the chain and warp, but for the finishing of a finer class of cotton textures, and works better on account of its inferior degree of adhesion and by being free of sand. Rice starch is obtained almost exclusively by the process of elutriation.

Maize starch was invented by James Coleman in 1842, and immediately manufactured for the traffic by Thomas Kingsford in Oswego, New York, who is still owner of the largest establishment for the manufacture of maize starch. This starch possesses rich properties for imparting a stiff finish.⁸ For this reason it is frequently applied for medium and heavy filling and finishing.

The maize starch which at present appears in commerce is exclusively pure, while the article formerly contained a large residuum of azotic ingredients.

Starch of horse-chestnuts⁹ is obtained in France by a similar process as potato starch. This chestnut starch develops itself after some boiling in an excellent manner. Starch of acorns has also been used for finishing.

Arrowroot starch from the fleshy (pulpy) root of *Maranta arundinaria*⁵ and *indica*, and from *Canna edulis* (*Tous les mois*), from *Carenum* (Tigger) and from *Arum maculatum*⁶ (Portland starch) are very much alike and hence appear in commerce under the same appellation, although frequently adulterated by potato starch, etc. These starches have for finishing purposes but very inferior importance and use, although they may be applied otherwise. In Japan the starch made of *ferrocot* (*Pteris aquilina*) is much used for finishing purposes. This root contains the starch in fibrous piths or parenchyma, which latter after extracting the starch serve as material for making ropes. The paste gained from this starch is very clear and translucent, and becomes very strong and dense; it is mixed with the juice of unripe peaches, and is then called *Shibu*. Besides these, Kudzu starch is made of *Pueraria Thunbergiana*, which is of excellent quality. In this category we count also the

1. Botley, Chem. Techn. (Investigations) v. ed. p. 802.

2. Especially since A. Penca has proved that rice starch, as to its quality, is preferable to wheat starch, notwithstanding the higher price of the former.

3. Maize starch was used first in United States of America, then in Brazil, and finally in Australia, and has there totally crowded out all other kinds of starch. In Europe, J. Wilmser was the first, who drew attention to its superior properties for stiffening. Vide. *Bechmanns des Pflanzenreichs* by Wilmser, 1872, Leipzig.

4. A very extensive description is found in Muspratt's Chem. 11. Ed. Starch.

5. Treatise of the same, vide L. v. Wagner, *Stärkefabr.* p. 137.

We refer here particularly to the system of Martin, how to manufacture starch, which of late has gained a superiority.

6. Dr. V. Kurrer. *Bechmanns Geschichte der Pflanzen* (History of Plants) 1784, vol. I. p. 240.

7. Bohr, *The Cotton Culture* (Kattunbau) v. II. p. 41. Salsp.

8. *Bechmanns Geschichte der Pflanzen* (History of Plants) 1784, vol. I. p. 362.

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PRICES CURRENT.

PHILADELPHIA, SEPTEMBER, 1880.

DYES AND DYESTUFFS.

Acetic Acid.....	3 lb.	5	6	8
Albumen, Blood.....	50	60		
Albumen, Egg.....	85	95		
Alum, ground.....	21	24		
Alum, lump.....	21	24		
Anato, prime.....	30	40		
Anattoine.....	1 30	1 50		
Aniline Oil, English.....	26	30		
Aniline Oil, French.....	28	36		
Aniline Salt, crystalline.....	30	40		
Aniline Salt, cake.....	22	30		
Archil Liquids, best.....	16	25		
Angora, crude Oporet.....	7	10		
Angora, crude Sicily.....	16	20		
Angora, refined St. Ant. Brown.....	24	32		
Angora, refined Gray.....	30	33		
Angora, refined Light.....	24	32		
Aqua Ammonia.....	6	6		
Aqua Ammonia, F. P. F.....	6	6		
Aurine.....	75	90		
Barbary Root.....	5	6		
Barwood.....	21	24		
Bichromate Potash.....	13	14		
Bleaching Powder.....	21	3		
Borax, refined.....	10	13		
Brazil Wood.....	3	5		
Blue Vitriol.....	3	5		
Brimstone, roll.....	34	34		
Canwood, pure.....	8	12		
Canwood, No. 1.....	8	10		
Carbonate of Ammonia.....	5	5		
Cauldrie Soda, 60 per cent.....	4	6		
Cauldrie Soda, 70 per cent and over.....	4	6		
China Clay.....	24	25		
Chile Acid.....	75	85		
Cochineal, Honduras.....	70	75		
Cochineal, Mexican.....	65	70		
Cochineal, black Teneriffe.....	70	75		
Copper.....	1	1		
Cream Tartar, crystals.....	36	38		
Cream Tartar, powdered.....	36	38		
Crimson Spirits.....	13	14		
Cudbear, pure.....	20	25		
Cudbear, No. 1, French.....	15	16		
Cudbear, No. 1, French.....	23	28		
Cutch.....	10	11		
Divi Divi.....	50	75		
Dipping Acid.....	10	10		
Extract Fustic.....	13	20		
Extract Hyperic.....	19	24		
Extract Indigo.....	16	18		
Extract Logwood, bulk.....	9	9		
Extract Quercitron.....	7	9		
Flavine.....	25	30		
Fuchs, Cuba.....	14	2		
Fuchs, Maraschino.....	11	21		
Fuchs, Savinilla.....	6	7		
Gambier, bales.....	6	7		
Glauber's.....	14	2		
Green Ebony.....	4	6		
Hyperic.....	14	2		
Irish Moss.....	4	6		
Iron Nitrate.....	8	8		
Indigo, Auxiliary.....	10	12		
Indigo, Bengali.....	1 45	1 55		
Indigo, Caracas, fine.....	1 05	1 10		
Indigo, Guatemala, fine.....	1 35	1 60		
Indigo, Madras, fine.....	95	1 05		
Indigo, Manila.....	85	95		
Lac dye, fine powdered.....	18	22		
Lac dye, good powdered.....	10	16		
Linn Wood.....	31	41		
Logwood, Campechy.....	14	2		
Logwood, Honduras.....	18	22		
Logwood, Laguna.....	23	28		
Logwood, St. Domingo.....	14	11		
Madder, Dutch.....	11	12		
Madder, French.....	2	2		
Marble Bark.....	2	2		
Marble Dust.....	1 50	1 75		

Myrabolan.....	5	5	6
Muriate Acid.....	11	11	24
Muriate Tin.....	84	94	
Muriate Tin, strong.....	19	22	
Muriate Tin, oxy.....	19	24	
Muriate Tin, crystals.....	21	21	
Nlewood.....	21	3	
Nitrate Iron, pure.....	7	9	
Nitrate Lead.....	7	11	
Nitric Acid, (Aqua Fortis).....	28	28	
Nutgall, Aleppo.....	25	28	
Orchille.....	16	22	
Oxalic Acid.....	10	11	
Pearl Ashes.....	64	74	
Persian.....	20	28	
Pieric Acid.....	46	50	
Potashes.....	5	6	
Prussiate Potash, yellow.....	27	81	
Prussiate Potash, red.....	65	70	
Quercitron.....	11	2	
Redwood.....	24	24	
Red Sanders.....	3	4	
Sulphate of Soda.....	4	6	
Starch, Corn.....	4	6	
Starch, Potato.....	6	6	
Starch, Wheat.....	6	9	
Safflower.....	24	40	
Safflower extract.....	7 00	8 00	
Salt Ammoniac.....	12	13	
Salt Soda.....	14	2	
Sapanwood, ground.....	2	3	
Soluble Lape.....	60	80	
Sugar Lead, brown.....	104	11	
Sugar Lead, white.....	22	24	
Sunne, Sicily, according to grade.....	75	80	
Sunne, V.....	50	55	
Soda Ash.....	18	20	
Sulphuric Acid.....	14	25	
Tartaric Acid.....	55	60	
Terra Japonica.....	41	6	
Turner.....	13	25	
Ultramarine.....	13	25	
Verdigris.....	30	35	
Wood.....	10	12	

BUSINESS OPPORTUNITIES.

F. J. BIRD, AUTHOR OF THE DYERS' HAND BOOK, is prepared to furnish reliable recipes in any branch of Dyeing, and will have pleasure in making to any color or shade for special customers, of his new Aniline Colors. See advertisement, page 8.

Address, 312 St. Marks Ave., Brooklyn, N. Y.

THE MORDANT CONTROVERSY.—By an error common to all printing offices, in our July issue the "Statement from Leeds Manufacturing Company," dated June 30th, on the making up of the form, was placed after the "Statement from Mr. Bird," thereby conveying the idea that it was a reply to that gentleman's last communication, whereas it had sole reference to the first. We desire the more to set this matter straight, since we see that our esteemed contemporary of London, the *Chemical Review*, has transferred it to his page in the same order, for which inadvertency we alone are to blame.

PRIERE MARCELLE of Dieulefit Drome, has recently proposed the following mixture for dyeing deep blues upon wool, and as he has gone to the expense of taking out a patent for his process he seems to consider it an invention and a novelty: Ten to twelve parts extract of logwood, 11-5th part extract of fustic, 12-14 parts of copperas, ten parts sulphate of soda, three parts bluestone three parts bichromate of potash, 24 parts gall-nuts, and five parts aniline blue. We suppose the aniline blue is to be applied after the goods have been grounded with the other ingredients. From the quantity of gall-nuts used this blue dye will come somewhat expensive.

(Continued from page 202.)

Recipe No. 127.DEAD WHITE ON COTTON.
Bleached by Improved Chlorozone.

Make a bath of

1 gallon Improved Chlorozone, [E. Lefranc, New York.
20 gallons Water.

Enter yarn, give 2 to 3 turns, let remain for 3 hours, wash and done.

This is an improved article of Chlorozone, and we advise dyers to try it.

Recipe No. 128.

BRIGHT GARNET ON WORSTED.

50 lbs. Yarn.

Dissolve 2 ozs. Orange, { Action Gesellschaft, Berlin.
10 ozs. Nacarai, { Henry A. Gould,
Boston, New York and Philada.8 ozs. Grenadine, { Meister, Lucius & Bruening, Hoechts, A.M.
Lutz & Movius,
New York, Boston and Philada.Add 5 lbs. Glaubersalt,
1 lb. Alum,
3 lbs. Sulphuric Acid.

Enter yarn at 180° F., or even at boiling point, turn 4 times, and boil for 45 minutes.

Recipe No. 129.

BROWN ON COTTON.

60 lbs. Yarn.

Prepare with 12 lbs. Cutch,
5 buckets Boiled Logwood Chips Lignor,
12 ozs. Blue Vitriol.

Give 3 turns and leave the cotton in this solution over night, next take out and wring well.

24 Bath, 2½ lbs. Bichromate of Potash. Enter boiling, give 4 turns, wring and re-enter into the old Cutch bath again; give 4 turns, wring well, and enter Chrome bath again; give 4 turns, wring again.

34 Bath, 2 lbs. Copperas, cold. Wring, re-enter old Chrome bath, give 4 turns, wring and finish in

½ lb. Alum,
1½ buckets Boiled Logwood Chips Lignor,
1 bucket Hypernic Lignor.

And turn to shade.

Note 1. The Logwood Chips Lignor is 24 lbs. of Logwood Chips to eight buckets of water.

Note 2. The Hypernic Lignor, is 36 lbs. of Hypernic to eight buckets of water.

Note 3. This is a superior brown on cotton, and although a great amount of labor, is one which is wanted.

Recipe No. 130.

NICHOLSON PURE BLUE ON WORSTED.

65 lbs. Yarn.

Dissolve 1½ lbs. Borax.

6 oz. Nicholson Pure Blue. { Badische Aniline and Soda Fabrik
Wm. Pickhardt & Kuttroff,
New York, Boston, and Philada.

Enter Yarn at 180° F., boil for 40 minutes, wash, and finish in Acid Bath of 1½ lb. Sulphuric Acid at 180° F.; wash and done.

Note. This is one of the strongest Aniline Blues in the market.

Recipe No. 131.

BOTTLE GREEN ON WORSTED.

100 lbs. Yarn.

Boil 5 lbs. Alum.

10 lbs. Glaubersalt.

½ lb. Red Tartar.

6 lbs. Sulphuric Acid.

40 lbs. Indigo Paste.

2 ozs. Orange Y, { J. Levinstein, Campbell & Co.,
New York.2 ozs. Aniline Yellow, { F. Bredt & Co.,
New York and Philada.

Enter at 180° F., and bring to boil, done in 1½ hour.

Note. To prevent unevenness, it is advisable to give half the amount of dye-stuffs at first.

This shade will stand light, and light washing, and will not rub off.

Recipe No. 132.

NAVY BLUE ON WORSTED.

50 lbs. Yarn.

Add to a slightly Alkaline Bath.

½ lb. Nicholson Blue R, (Guernsey) { Meister, Lucius & Bruening, Hoechts, A.M.
Lutz & Movius,
New York, Boston,
and Philada.

Run the Worsted for 40 minutes boiling, wash, pass through another vat with 1 lb. Sulphuric Acid boiling, give 3 turns, hang up and add

3 lbs. Indigo Carmine.

2 lbs. Archil Carmine.

Enter Yarn at 180° F., run lively, and finish with six to eight turns.

Recipe No. 133.

BRONZE ON CARPET YARNS.

100 lbs. Yarn.

Boil up 5 lbs. Glaubersalt.

2 lbs. Alum.

2 lbs. Sulphuric Acid.

1 lb. Picric Acid.

½ lb. Archil Carmine.

1 lb. Indigo Paste.

2 lbs. Turmeric.

Enter Yarn and boil ½ hour.

Recipe No. 134.

FEACOCK ON WORSTED.

30 lbs. Yarn.

Give the yarn a regular Alkali Blue bottom, with

1 1/2 to 2 ozs. Nicholson Blue 3 B.

Wash, sour off, and boil up the same Acid bath, adding:

1 1/2 lbs. Indigo Carmine.

1 to 2 ozs. Archil Carmine.

1 oz. Picric Acid.

Cool off, enter yarn, turn quickly until even.

NOTES OF THE MONTH.

All communications under this head will meet with due attention, and coloring matters will be fairly tested.

ARTIFICIAL INDIGO is meeting with great success in Europe. Messrs. Pichardt & Kutruff, N. Y. expect to have it here shortly.

We have tried the Chesapeake Flavine, furnished to us by William Dawson, and find it a very superior article.

A. KLIPSTEIN, N. Y., has sent us a sample of Night Blue, a product of Bindsheller & Bush, Basel, which we will sample next month.

ALIZARINE RED on Cotton is dyed in Philadelphia to equal any imported Turkey Red.

READ, HOLLIDAY & SOSS have opened an office in Philadelphia, at 45 N. Front St. They are introducing their standard products of Anilines.

E. SEHLBACH & Co., N. Y.—New Blue and New Bismark Brown, dyed only with sulphuric acid, are gaining favor.

PETRAUX BLUE, in brilliancy is superior to indigo, and Alexander Barril, N. Y., is meeting with encouragement. Dyed according to the French formula, it stands acid, air and light.

OXYKALI SOAP is especially manufactured, for Silk and Wool, by the Allan Hay Co., N. Y. It is a product which Dyers ought to try.

E. LEFRANC'S (N. Y.) Improved Chlorozoene is meeting with great success for bleaching all vegetable fibres.

A. KLIPSTEIN, New York, is sole agent in the U. S. for the Alum Proof Ultramarine Blue, for paper manufacturers, made by F. Richter, Lille, France.

OUR TABLE.

THE PRACTICAL DYER'S GUIDE. By David Smith, Halifax, England.

We have seldom had the satisfaction of finding on our table a more thoroughly useful book than that which has been politely forwarded to us, entitled as above. There are many handbooks of dyeing; some good, some indifferent, and some useless. When, under such circumstances, we meet with a well considered treatise so purely practical as that now before us, we cannot avoid coming to the conclusion that our

beautiful art is moving *pari passu* with the progress of the age. When men like the author of this excellent book set themselves in earnest to the task of conveying their own experience to the public, they certainly confer a favor on those for whom they labor, and that labor should be liberally and generously rewarded. The most congenial reward to an author is the wide dissemination of his work, and we know that this book will, from its intrinsic merit, work its own way to confidence once its pages are examined. Spirit-making is so instructively treated and explained, with such admirable simplicity, that dyers generally cannot but derive advantage from the lessons taught. There are given reliable recipes for numerous dyes on cotton wool and silk. These comprise shades of great variety accompanied by methods of mixed dyeing. Aniline colors are fully noticed; all the blues, browns, violets, yellows are exhaustively treated; and, in fact, nothing is slighted which can add in the least to the knowledge already possessed by the operative dyer. We are glad to see that the industrious author has treated the subject of water as required for its quality by the dyer. This is a subject too often neglected, and not unfrequently leads to difficulty, which may be overcome by due attention to the advice herein given, as well as re-agents for tests. Silk, damask, camlet, lasting and woolen shawls are taken into consideration and well explained. There is a chapter on padding, as also others on silk warp, skein and handkerchief printing. The subject of extracting burrs from wool is explicitly treated; and, in conclusion, we would say, in perfect candor, that we know of nothing to be wished for in "The Practical Dyer's Guide," which is handsomely got up in library style, and contains a copious index of technical terms to be found in the volume, thus rendering the work complete.

The well-known Geo. P. Rowell & Co., N. Y., have furnished us the AMERICAN NEWSPAPER DIRECTORY for 1880. It is a carefully collated utility book of a thousand well printed pages, as elegant in appearance as valuable in contents. Merchants, traders and newspaper publishers cannot fail of finding in this excellent compilation abundant and reliable information worth to them considerably more than the \$5 asked for it.

A small book (demi octavo) has been sent us through the mail, entitled the WESTERN FARMER OF AMERICA, by Aug. Mangredien, and bearing the truly British signet stamp, Colden Club. We come to the conclusion, on viewing the cover, that this surely was a "protection missive," for does it not declare "all rights reserved?"

We have received the first number of a new publication entitled the TEXTILE RECORD OF AMERICA, which has just made its appearance in this city. It is edited by Mr. Lorin Blodgett and presents a handsome appearance.

QUERIES AND REPLIES.

Under this head we invite all our friends to make their inquiries on every subject connected with dyeing, etc., and we will endeavor to give them such information in answer as they are in need of. We also invite others to give us the aid of their experience in such replies. All will be welcome.

QUESTIONS.

80.—What are *valonia nuts*? Are they used in dyeing?

X. Y.

81.—Is not **WELD** the Dyers' Weed?

F. T.

82.—What is the difference between the two hydrometers, Beaume and Twaddle?

SUBSCRIBER.

83.—What is the difference between *Cutch* and *Terra Japonica*, and how are they distinguished?

STUDENT.

84.—What is "Hypernic," and where can it be obtained in England?

ZERO.

ANSWERS.

76.—W. J. Providence, R. I.: We have been informed that A. Klipstein, 52 Cedar St., N. Y., has the New Aniline Oil, also the New Aniline Crystals for producing the non-greenable aniline black.

77.—By using less Fuchsin the difficulty will be prevented.

78.—We know of no aniline scarlet which will not bleed in fulling and stain the white. It is the peculiarity of the anilines that they will stain readily fabrics. We would recommend "Summit" to try the Alizarine advertised on page 3 of present issue, which will, we think, meet all requirements.

79.—1. By using Extract of Logwood as the base in dyeing wool black, the best results can be gained by the use of Sulphate of Copper, Bluestone, and Soda Ash. It can be dyed in one bath at a cost of from 2 to 3 cents. The special recipe can be procured from our office. 2. For using any Aniline Scarlet R. R., Sulphuric Acid, and Glaubersalt, numerous recipes have been published in the TEXTILE COLORIST. 3. It can be dyed by an Indigo Vat (either cold or warm) at a cost of about 7 cents per pound. The Special Recipe can be procured from our office.

80.—*Valonia nuts* are the excrescences found upon the oak tree, called also *knoppers*. They bear some resemblance to gall-nuts, but their form is more irregular. In Germany they serve as a substitute for galls and sumac in dyeing, as they contain some astringent matter. Like most substitutes, they are inferior and are more suitable for tanning than for dyeing.

81.—Yes, **WELD** is Dyers' Weed—although the latter name is applied to other substances.

82.—Each degree of Beaume is about equal to 1½ degree of Twaddle, up to 30°. This estimation will answer the purpose in reading foreign recipes for dyeing; but, for accuracy some standard tables should be sought.

83.—We have an article on *Cutch* in this month's number, to which we would refer "Student" for answer to his query.

84.—Our friend will find his question answered in the June issue in "73" of Answers. We cannot say particularly where it can be had in England, but presume any of the large importers of dye-woods have it.

CORRESPONDENCE.

In this department of the TEXTILE COLORIST we propose to publish all letters pertaining to the business of dyeing, bleaching, etc. But we wish to be distinctly understood that we will not hold ourselves responsible for any flatulencies set forth by writers.

FLATBUSH, September 27, 1880.

Dear Sir:—In answer to Mr. Bird's letter in your August number, I enclose my process for bleaching wool extracts, so that your readers may judge of its value without making any experiments in the presence of Mr. Bird.

PROCESS FOR BLEACHING DARK WOOL EXTRACTS.

The rags to be bleached are passed through a cold or lukewarm Sulphuric Acid bath, at about 2° B., for about three to five minutes; then taken out and let to drain; after which they are put for about one-half an hour in a second bath containing Sulphuric Acid of Sodium in such quantity as to neutralize the Sulphuric Acid from the rags. Sulphurated Hydrogen is produced, and acts as a bleaching agent. Taken out from this bath, the rags are washed. The quantities of Sulphuric Acid I have used for 100 lbs. of wool extracts are: 5 lbs. Sulphur dissolved in 6 lbs. Caustic Soda, at 70 per cent. When the rags coming from the acid bath are put in the Sulphuric bath, in case this one should not be neutralized, then more acid must be added to make it slightly sour. [Sulphuric Acid of Sodium, produced by the reaction of charcoal on Glaubersalt, would be cheaper.] When the Sulphuric Acid process is used for Extracts, after the rags have been passed through it and dried they can be bleached by putting them directly in the Sulphuric Acid of Sodium bath—washed after—making then only one bath for bleaching, as Mr. Bird required.

I remain, respectfully yours,

J. LAMBERT.

(Expressly translated from the *Färber Zeitung*, for the TEXTILE COLORIST, by J. Frankel.)

The Application of the Azo Dyes, Orange, Ponceau, Bordeaux, etc.

BY DR. E. ALLRICH.

Every dyer is aware of the fact, that all materials will not bear this treatment with alumina mordants, because they become harsh. In this case, instead of alum, the tin solution (scarlet spirit) and phosphate of soda is used. Although the colors attained thereby are not so pretty as those produced with alumina, they nevertheless exceed those obtained with tin solution and cream of tartar, or colors obtained in any other manner. But it is of greatest importance, to avoid the excessive use of tin, and to use so little that the bath after dyeing still retains some color, and is not water clear. If the latter is the case, it may be accepted as a certainty, that the effect has not been a favorable one. With 4 per cent. phosphate of soda it is best to take but 3 per cent. of tin solution of about 35° B., diluted with water, and added in two different parts, as described in the use of alum. If too much water is in the kettle, the quantity of the material may be increased. It may be here observed, that by using soft water and tin, with only 2 per cent. phosphate of soda; 1½ to 2 per cent. solution of tin will be sufficient. By the use of tin, the goods may be entered at a higher temperature, and the bath be used continuously, without cooling; only requiring the original quantity of phosphate of soda in each dyeing.

In producing the finest colors on military goods, it is necessary to previously bleach the wool with 1 to 2 per cent. permanganate of potash. The operation consists in turning the saturated piece in the above named cold solution in a zinc-lined box, until the red color disappears and the piece turns brown; it is then taken out. Enter the goods in a warm bath of about 40° C., containing 10 per cent. sulphate of soda and a weak solution of sulphuric acid. As soon as the piece becomes a pure white, it is washed in cold water, and finally finished in a weak soda solution, until all the acid is neutralized, which may be ascertained by applying blue litmus paper, which when in contact with the cloth must not turn red.

The dyeing of the Turkish caps requires especial care. It is best to work with tin solution in the following manner: The weighed off quantity of tin is diluted and divided into 5 parts. The caps are boiled with the necessary quantity of phosphate of soda and dye stuffs, until they are completely saturated. They are then taken out and turned; whereupon the first one-fifth of the tin solution is entered in the bath, steam turned off, and caps entered again for a quarter of an hour, well turned and taken out again. Caps turned, adding the second one-fifth of the tin solution to the bath, and repeating until all the tin is in the bath; whereupon it is brought to a boil. By this method of dyeing, the same bath may be used several weeks. For the production of the much favored Mohika shade on "Fcz", it is best to use 3 per cent. Ponceau RRK, 1.5 per cent. Cocchine and 0.5 per cent. Bordeaux B. It is in this case, of particular importance, to work with as little water as possible.

It is already sufficiently well known, and mentioned above, that the dye-stuffs of the dye-works of the former firm of Meister, Lucius & Bruening, in Höchst (Germany), will dye yellowish in the heat, for which reason the color must be kept more blue than the pattern. In order to produce especially fine effects upon such goods, where fastness is not important, but beautiful effects desirable, it was formerly customary to add from 5 to 10 per cent. Eosine of the weight of the Ponceau or Cocchine to beautify the color. Since however, the firm at Höchst has issued the new superfine qualities of Ponceau in a yellowish and bluish shade, it is no longer necessary to have recourse to that means. These new products, which are fast, are equally as pretty as Eosine or Cocchine.

If, for any reason, neither of the two described treatments is desired, it may be remarked that of all other methods, those which consist in the exclusive application of the sulphate of soda or sulphuric acid, are the best, and render the same service as all imaginable combinations which can be found in the dictionary of the dyers.

The printing of wool is simply the mixing of the dye-stuff solution with thickening matter. The Bordeaux thus prepared causes some difficulties, because it possesses the property of gelatine. If a moderately concentrated solution is allowed to cool off, and because the thickened mixture possesses too great a consistency and tenacity to permit of an easy imprint. In this case, recourse is had to adding to the solution of the dye previous to the thickening, some acetate of alumina, to produce a lac-dye, which of course, no longer gelatinizes. Instead of the acetate of alumina, acetate of lead, or nitrate of lead, chlorbarium and similar substances may be applied.

The dyeing of the finer qualities of cotton yarns is performed as follows (for 100 k.):

a. Soap-bath. About 6 k. Marseilles soap and 2 k. good glue, with better gelatine, are dissolved in a bath of nearly 50° C., and the cotton is entered for half an hour, occasionally stirring; then wring.

b. Tin-bath. Chemically pure tin is dissolved in a mixture of one part nitric acid of 36° B., and two parts muriatic acid (com-

mercial), until the acid is saturated, diluting to 5° B.; enter wrung yarns in this bath, let it remain for one hour, then wring out thoroughly.

c. Alumina-bath. 8 to 10° B. Enter cotton for two to three hours, and then wring thoroughly. To prepare the acetate of alumina: 10 k. sulphate of alumina are dissolved in 20 liters of boiling water, and then 7.5 k. crystallized powdered soda slowly added. Thereupon 10 k. acetate of lead is dissolved in boiling water and both solutions, after having cooled off to about 50° B., are mixed and filtered. This labor is in consequence of the high concentration somewhat hazardous. A weaker solution of acetate of alumina as low as 5 per cent. can be used, but the yarn will have to remain longer in the bath. The residuum of sulphate of lead remaining on the filter, can be washed out and the liquid may be used for dilution in the next operation. The cheapest method for the preparation of acetate of alumina is perhaps the following: Commercial moist hydrate of alumina is dissolved in acetic acid of 7° B., by moderate heat, perhaps in an acid retort, which is placed in a drying-room, adding to the clear solution, so long hydrate of alumina, until there is an overplus and no more will dissolve.

d. Dye-bath. Dissolve 3 to 6 k. dye-stuff; enter the goods cold; heat slowly to about 90° C., let remain some time in the bath, wring and dry. If by the preparation of the acetate of alumina, a surplus of acetate of lead is applied, fuller colors may be obtained, but they will not be so brilliant. The colors thus obtained do hardly rub off. To avoid this entirely, it is to be recommended, the addition of a decoction of "soap-wort" to the dyers' bath. In this case however, the solution must be kept up somewhat stronger, in order to obtain equally strong dyes. The mordants and dye-baths are always used again, and are, by renewed additions, always brought to the original strength. In the dye-bath, as much dye-stuff is retained as by the succeeding finishing of dyeing, only 1 to 2 k. new dye-stuff need be added.

(To be continued.)

TANNIC ACID.—A patent has been obtained in Germany to produce tannic acid in the form of crystalline needles. For this purpose a spirit, or ether solution of tannin, is evaporated in a copper vessel, or in vacuo, till a sample, when cold, can be broken without adhering to the fingers. This mass is brought into a vessel provided with a double bottom for the admission of steam, and which contains a number of holes, through which the warm and therefore soft tannic acid goes, and, as the apparatus is 5 metres high, it forms a thin thread. This falls through the warm apparatus on a wooden or metallic cylinder, kept in quick motion, from which the thread is taken and broken into small bits.

ANTIMONIAL CINNABAR.—This pigment may be prepared by dissolving four parts tartar emetic and three parts tartaric acid in eighteen parts water at 140 degs. Fahr., adding a solution of hyposulphite of soda, and heating to about 194 degs. Fahr. Or, four measures of solution of muriate of antimony at 38 degs. Tw. are mixed with ten measures of water and ten measures of a solution of hyposulphite of soda, and very gradually heated to 131 degs. Fahr. Antimonial cinnabar consists of small particles of a fiery redness, permanent against air, light and moisture, and in mixture with other metallic colors. It is serviceable as an oil and water color, but not for fresco, or silicate of soda painting, as it is decomposed by alkalis.

Printing on Cotton.

BLACK.—4 pounds White Starch,
 5½ quarts Water,
 4½ " Indigo Substitute, { Joh. Rud. Geigy, Basel.
 { Fisher & Keller, New York.
 1 " Gum-tragacanth Water,
 1 " Red Oil,
 2½ " Ext. Persian-berries 30°.
 Boil and add when cold,
 ½ quart Acetate of Chrome 20°,
 ½ " Bisulphite of Soda 41°.

OLIVE.—8 pounds White Starch,
 10½ quarts Water,
 4½ " Indigo Substitute, { Joh. Rud. Geigy, Basel.
 { Fisher & Keller, N. Y.
 2½ " Gum-tragacanth Water,
 1 " Red Oil,
 2½ " Acetic Acid,
 3½ " Ext. Persian-berries 30°.
 Boil and add when cold,
 1 quart Acetate of Chrome 20°,
 ½ " Bisulphite of Soda 41°.

BLUE.—6 pounds White Starch,
 12½ quarts Water,
 2½ " Indigo Substitute, { Joh. Rud. Geigy, Basel.
 { Fisher & Keller, New York.
 2½ " Gum-tragacanth Water,
 1 " Red Oil,
 2½ " Acetic Acid.
 Boil and add when cold,
 1 quart Acetate of Chrome 20°,
 1 " Bisulphite of Soda 41°.

INDIGO BLUE. A New Product.

0.300 kilos Blue Indigo C or CA, { J. C. Bloomfield & Co.,
 { New York and Phila.
 1 " Eau d'adraguante,
 0.500 " Acide 'Acétique 40 per cent.,
 0.130 Acetate de Chrome 10°.

The Blue Indigo C and CA have to evaporate same as the Alizarine colors, one or two hours (two hours preferred). The one marked C requires a soaping in order to obtain a maximum of beauty.

Fast Shades on Wool.

LEAD GREY.
 (For 220 pounds.)

Boil for an hour with
 Logwood..... 22 lbs.
 Sumac..... 4 lbs. 6 ozs.
 Turmeric..... 1 lb. 1½ ozs.
 Argol..... 4 lbs. 6 ozs.
 Alum..... 1 lb. 1½ ozs.

Towards the end of the time sprinkle the wool, turning it continually, with the solution of

Copperas..... 17½ ozs.
 and boil still for half an hour.

SOLID MAROON FOR WOOL AND WOOLEN YARNS.
(For 110 pounds.)

Young fustic in a bag..... 17½ lbs.
 Logwood..... 5 lbs. 7 ozs.
 Orseille..... 2 lbs. 3 ozs.
 Make a decoction, and add to it the decoction of
 Camwood or sanders..... 15 lbs. 5 ozs.
 Madder..... 22 lbs.
 Sumac..... 13 lbs. 2 ozs.
 Argol..... 4 lbs. 6 ozs.
 Work in this beck at a boil for an hour, and then add
 Bluestone..... 2 lbs. 3 ozs.
 Boil for half an hour, and sadden with
 Copperas..... 2 lbs. 3 ozs.
 Lastly top with
 Ammonia..... 2 lbs. 3 ozs.

BLACK ON WOOL.
(For 22 pounds.)

Flannels are often made in black and red with black and white wool, dyeing afterwards a scarlet. Otherwise the wool is taken vat blue and white. The pieces are then dyed scarlet and come up red and black. A black for this purpose must be able to resist the scarlet dye to follow, and differs essentially from common blacks.

The dye is made up as follows:—

Logwood..... 35 lbs.
 Fustic..... 11 lbs.
 Argol..... 4 lbs. 6 ozs.
 Alum..... 2 lbs. 3 ozs.
 Work in this bath at a boil for 90 minutes, and sadden in the same with the addition of
 Copperas..... 4 lbs. 6 ozs.
 Bluestone..... 17½ ozs.

Boil for half an hour.

For scarlet dyeing proceed gently, and do not let the pieces remain more than half an hour in the cochineal bath.

A chrome black must not be used for the tin crystals, and the oxalic acid would turn it to a violet or a brown.

ASH GREY FOR WOOL AND YARN.
(For 67 pounds.)

Boil for an hour and a half with
 Bichromate of potash..... 2½ lbs.
 Sulphuric acid..... 3½ lbs.
 Let cool in the flot, lift, and dye in a fresh water with
 Logwood..... 7 lbs. 10 ozs.
 Sumac..... 2 lbs. 3 ozs.
 Carmeline..... 1 lb. 1 oz.
 Boil for an hour and sadden with
 Copperas..... 2 lbs. 3 ozs.
 Argol..... 2 lbs. 3 ozs.

GOLDEN MAROON.
(For 351 pounds.)

Mordant for an hour and a half with

Bichromate of potash.....	6 lbs. 9 ozs.
Sulphuric acid	31 lbs.
Alum.....	6 lbs. 9 ozs.
Oxalic acid.....	17½ ozs.

Dye in a fresh water with the decoctions of

Young fustic.....	.66 lbs.
Logwood.....	6 lbs. 4 ozs.
Carmelino.....	6 lbs. 4 ozs.
Orchil.....	13 lbs. 2 ozs.

Let the decoction cool, enter the mordanted goods, and boil for an hour. Sadden in the same bath with

Copperas.....	4 lbs. 6 ozs.
Bluestone.....	27½ ozs.

Work for half an hour and rinse.

TEA SHADE.
(For 351 pounds.)

Mordant at a boil for an hour with

Bichromate of potash.....	17½ ozs.
Argol.....	2 lbs. 3 ozs.

Let cool in the flat, and dye in a fresh water for an hour with

Young fustic.....	2 lbs. 3 ozs.
Carmelino.....	8½ ozs.

and a little extract of indigo.

DEAD LEAVES.
(For 55 pounds.)

Mordant as above and dye with

Catechu.....	6 lbs. 9 ozs.
Young fustic.....	4 lbs. 6 ozs.
Logwood.....	2 lbs. 5 ozs.

MARINE BLUE.
(For 354 pounds.)

Mordant at a boil for 90 minutes with

Bichromate of potash.....	4 lbs. 6 ozs.
Sulphuric acid	6 lbs. 9 ozs.
Argol.....	9 lbs. 13 ozs.

Let cool in the flat, and dye at a boil for an hour with

Logwood.....	.55 lbs.
Extract of indigo.....	4 lbs. 6 ozs.

Tinturier Pratique.

Suggestions on Feather Dyeing.

(Continued from page 172.)

MAROON.

There is a variety of colors bearing this name, light, dark, reddish or yellowish, etc. They may be obtained from the curcuma, indigo-carmin and garnet. Yellow curcuma with indigo blue carmine produces a green, which, neutralized with red-garnet, gives a black, mottled more or less with white, and the color inherent to the coloring matter amply em-

ployed. If curcuma were made to predominate, a yellow maroon would be the result, and this would most likely be called otter; if on the other hand, garnet were chiefly resorted to, a maroon color of a reddish shade would be produced.

TENDER FEATHERS.

To prepare a maroon bath, a certain quantity of garnet (to be regulated by the tone and shade of sample) is boiled, for from 5 to 10 minutes, in as much water as is considered necessary to dye a given weight of feathers. If the garnet exists as an extract, this first operation may evidently be dispensed with. As soon as the garnet is well dissolved, there is added to the bath sulphuric acid containing an admixture of cold water, so that subsequent upon the neutralization of the alkalinity of the garnet, there is a small remnant of it set free. At this juncture, curcuma and indigo-carmin is added in a small quantity, the bath being kept boiling so as to thoroughly extract the yellow coloring matter from the former, and, at the same time, to mix these three matters well together. Now the feather is introduced; if it is a very delicate one, care must be had that the boiling of the bath be not prolonged. At the start the indigo-carmin and the curcuma are precipitated upon the feather in a manner to produce within the first moments, a dirty green; gradually however, the garnet bites and the color becomes maroon. By means of successive additions of indigo-carmin and curcuma, the color is brought to the required degree of shade. If the quantity of garnet originally taken was too small, more is added. The bath may be kept comparatively clear; the garnet is never entirely drawn, but almost all of the curcuma and the whole of the indigo-carmin may be utilized, unless it is desired to produce very dark colors.

From time to time samples are taken. When the dyeing is thought to be satisfactory, the bath is rinsed with cold water, supplemented by some sulphuric acid, three or four times, so as to disentangle the feathers completely from all foreign substances.

The dye may come out too dark. [We must however, be guarded against an illusion likely to deceive the inexperienced.] Sometimes a maroon appears too black, because the carmine exceeds both the garnet and the curcuma, so that it often suffices to add a convenient portion of the two latter to see that this apparently black color is in a measure obliterated, and that the dyed feather has less consistency than the sample. This happens likewise, whenever there is an excess of curcuma, and in such a case the shade appears too yellow. Hence we should have in this color as in all the others, both the requisite strength and the shade.

When too much of a coloring matter has been employed, the thing may be remedied by giving the feather a fresh bath containing two of the coloring matters, and excluding the one

which has produced the inconvenience. According to the greater or less intensity of shade, the bath must be heated more or less. Between the feather and the bath there is established a sort of equilibrium, one giving off what the other is lacking. Thus a maroon which is too red is rectified in putting the feather into a more or less hot bath of carmine and curcuma. It will be perceived that this method can be easily applied, whether too much garnet or too much carmine has been taken, since these matters have for water an affinity almost as close as for the feather; but with the indigo-carmine the case is different. In this latter case one is, in fact, obliged nine times out of ten to draw the dyed feather through carbonates and soap, and in some isolated instances, to have recourse to the bold style indicated for the garnet.

Occasionally, to dye a maroon color, the old baths which have served to make either granate, other maroons or sorrel are utilized. Unless one disposes of pretty recent baths, fresh coloring matters will always have to be added to these old baths; for otherwise no beautiful dyes would be produced.

As regards very tender feathers requiring to be dyed a maroon color, such as the down of turkeys, etc., a certain but too frequently occurring accident must be guarded against. If, particularly in the beginning, there is too much indigo-carmine in the bath, the tender particles absorb it rapidly, become soon saturated with it, owing to their tenuity, and the sorrel not having then any more affinity for them, they remain black. This accident is the more to be feared as these feathers cannot bear to be over-heated nor to be too much rubbed with the carbonate and soap, lest they should be burned, so that it is often impossible to apply to them the remedies indicated for the other sorts of feathers.

HARD FEATHERS.

The process of treatment is similar to the former, except where a hard feather is used, then it would be advantageous to slightly modify it. As archil is the slowest to dye, the feather is at first well boiled in a bath containing this coloring matter merely, and it is only after a sorrel color has been obtained, that eureka is first and indigo-carmine next (or both mixed) poured into the bath.

OSTRICH FEATHER.

The procedure for dyeing the ostrich in maroon is the same as with the tender feather. It is nevertheless very seldom that in this case an equality, as great as in the two preceding instances is attained. Even after having heated the feather vigorously and for a long while in its bath, differently shaded feathers will be the result. Many times also the extremities of the down, and particularly the upper portions of the feathers, having been worn out through friction, turn more red than the remainder of the feather. In that case the feathers must be ranged as to shade; those most yellow must

be steeped the longest, so that the sorrel of the bath, in biting gradually, may color them red, while the others should be plunged into a very hot bath containing nothing but indigo-carmine and curcuma. The heads as well as other parts of the feathers that may be very red, must be soaked repeatedly. The extremities of the tail require above all, a long and careful treatment; for the feather manufacturers are not always intent upon ranging their feathers, in classifying them according to their nature; for example, it will be more difficult to dye a flat tip of the tail than a hooked one; and a tip of a male tail will not take dye like a female one. Sometimes also, tips of the tails require to be dyed, that is to say, tips composed of a number of pieces, varying from two to infinity; and the greater the number of pieces, and the more feathers differ amongst themselves, the greater will be the difficulty. As regards sufficiently strong dyes, the only way to produce them is to dye the different parts separately; in the contrary case we must content ourselves with a medium shade and tone, a thing which gives no satisfaction to the dyer nor to the customer, without either of them finding his profit therein.

It often happens that feathers already dyed in different colors require to be dyed maroon. As for those dyed indigo-carmine, lilac-blue, etc., the precaution must be used to let them soak a good while in warm water of carbonate of soda, for otherwise, owing to a sort of saturation, the sides of the feathers would not take the sorrel of the dye-bath.

HIDES, WINGS AND BIRDS.

Ordinary procedure.—If the mode already described is to be applied to skins, wings or birds, great precaution should be used; for besides looking to the good dyeing of the feather, the skin must be kept as entire and supple as possible. In themselves the archil or curcuma would exercise no pernicious action on the skin, but the indigo-carmine and the acid which must needs be employed are of destructive action; in fact, it is known that sulphuric acid slowly dissolves organic tissues; by reference to the first portion of this work it will be seen that indigo-carmine has an analogous action inherent to it. It is true that these matters are drawn out in a large quantity of water, but temperature is favorable to their efficacy, and water exercises a similar action. It sometimes happens that a portion of the dermatic tissue is dissolved, that the fibres contract under the action of the heat and that, upon drying the latter, being precisely from the want of soft matters interposed between them, kept from gliding upon each other, the skin becomes crude and brittle. These inconveniences may, in part, be assuaged by stretching the skin on its leaving the bath, so as to make it approach as far as possible, its primitive dimensions; next by drying same very slowly in nailing it upon a wooden screen, so as to make it preserve its shape, and after the drying process rub it with oil or better with a paste composed of glycerine and starch.

But, first of all, care must be taken to keep intact the skins, wings and birds. To do this, the dye-bath should be properly compounded at once, in order to avoid repeated heating; the temperature of the bath must be maintained constantly from 80 to 90°. If obliged to modify the ingredients of the bath, the dyeing matters must be taken out every time. Another precaution consists in not leaving these substances too long in the bath; hence it is advisable to operate as rapidly as the temperature and the nature of the feathers may require it.

Whatever precautions may be taken it is almost impossible to keep certain very thin and delicate skins, such as those of the cock, entire, there being most of the time nothing but an unslapen mass of feathers and pieces of skin taken out of the bath. In such a case another procedure must be devised, or else the dyeing of these substances must be abandoned. Here is a means giving pretty good results:

Procedure in wood.—The employ of acids and acidulous coloring matters is entirely omitted. Two baths must be prepared, one for mordanting, the other for dyeing. A slight dye with the aniline brown, or Bismark, is first given the skins, next they are mordanted by steeping them in a solution of bichromate of potash, not too much concentrated, at a temperature of 45°; the skins may be left in there all night without inconvenience. Next morning these skins are taken out carefully one by one, and are put into a decoction of logwood at 45 or 50°, leaving them five or six hours in that bath. At the expiration of this time, the dyeing is accomplished; in case it were not dark enough yet, the skins must be steeped once more in the solution of bichromate and then in the logwood.

Another Procedure.—Instead of giving a bath of Bismark, the bichromate solution together with a decoction of logwood and smal wood, in varying proportions (according to shade) may be resorted to.

With these two procedures the most tender skins are kept quite supple and entire in their dimensions, provided care is taken to dry them slowly at a moderate temperature.

Doubtless other analogous modes may be applied, and the question deserves to be studied more deeply than it has been up to the present; for there is real progress to be made in this direction, since the procedure with the employment of acid, produces unsatisfactory and often no results.

(To be continued.)

Tin in Dyeing.

To the practical dyer this metal is one of the most useful, as its salts prove most important in causing color to adhere to fibre. Its powers of extracting, either as a tincture or a muriate, the color from cochineal is well known. In fact it gives to all colors and compounds with which it is used an admirable beauty and reliable per-

manence. Tin is one of the scarcer metals, and comes, or has come hitherto, from some of the islands of the archipelago, in the Mediterranean Sea, and from Cornwall in England. We are now in possession of mines in California and Colorado, which will possibly leave us perfectly independent of foreign importation, and have the very desirable effect of reducing its present market price.

Being very ductile and light, it is easily handled and made available in the laboratory. In contact with acids it will decompose water, but is by no means so soluble in dilute sulphuric or muriatic acids as iron or zinc. Nitric acid will convert it into an insoluble oxide, but will not dissolve it. It is very slightly affected by organic acids, and on that account it obtains a preference for pans for the dyeing of delicate shades, for the extracting of colors, etc. But, on account of its softness and liability to fuse, vessels made of it are not to be always exposed to intense fire, it being safer to heat such by steam or boiling water. Tin readily dissolves in acids when placed in contact with copper, platinum, silver, and especially gold. In the presence of tin, copper is entirely unaffected by boiling muriatic acid. Hence muriate of tin can be safely prepared in copper pans, provided the tin be kept in excess. Tin is readily thrown down by zinc in its solution. It is also slightly precipitated by lead, the action soon terminating. Tin and iron dissolve simultaneously when placed in an acid together; yet by a curious arrangement the iron can be made to precipitate the tin. With oxygen, tin forms three compounds capable of combining with acids. One equivalent of tin, combined with one equivalent of oxygen, forms the protoxide. The salts are entirely colorless, having a very strong affinity for an additional quantity of oxygen, for which reason they become capable of acting as reducing agents. In contact with powerful alkalies, the protoxide of tin is capable of acting as an acids which forms what are called *stannates*. Two equivalents of tin combined with three equivalents of oxygen, form the sesquioxide of tin whose compounds are of a reddish amber hue. It is the principal agent in the formation of what is known under the name of *scarlet spirit*. Buxoxide or peroxide of tin contains two equivalents of oxygen to one of tin; the salts have the effect of oxidizing, the peroxide likewise acting as an acid, and, in combination with alkalies, forming stannates (salts of that name).

All of these compounds can be employed as mordants for various different purposes, according to their particular stage of oxidation and to the particular acid, together with its amount, with which they happen to be combined.

It is well to bear in mind that what enters into combination with the fibre and the coloring matter is an insoluble subsalt, and not an oxide, as it holds a part of the acid in combination. The persalts of tin are invariably preferred for wool, as the persalts of tin are chosen for cotton; the sesquioxides being in certain cases applicable to both. Those compounds in which tin acts as an acid, such as the stannate of soda, are almost exclusively applicable to cotton alone. Most of the dyers' spiritus, at least those formed by the action of a mixture of nitric and muriatic acids, contain proportions of protoxide and peroxide varying with the temperature in which the tin is dissolved. Those same ingredients may yield a perfect persalt, or a mixture abounding in it, in accordance with

the speed with which the metal happened to be added to the acid. The condition of a sample red spirit, solution, etc., being detected with great ease. As usually prepared, the persalts of tin present a very pale druse color, the protoalts being perfectly colorless. Adding a little chloride of mercury (corrosive sublimate), dissolved in alcohol or in water, to a tin spirit, a precipitate will be formed which speedily blackens, if any tin be present in a persalt state. But, if the tin be entirely a persalt, no action will be apparent. Should the temperature be permitted to rise higher than is needed for the formation of a perfect persalt, the consequence will necessarily be injurious. The tin may be precipitated either in part or altogether, in the state of insoluble peroxide, as a mordant utterly useless. This result is technically known as *firing*, being not uncommon in the hands of careless persons.

An excess of heat not sufficient to produce the fixing will quite destroy the affinity of the tin for the fibre; and a mordant so destroyed cannot be distinguished by specific gravity, smell, taste or color, from that which is in a proper condition. Even quantitative analysis will fail to point out the difference; and still there exist chemical means founded upon the comparative action of light on these fluids, by which their condition may be ascertained, as certainly as by dyeing tests of each. In the latter case the overheated sample will not become attached to this sample to any great extent, whilst the other will produce a full color. All this goes to prove that the peroxide of tin may exist in three distinct states, one only of which three having an affinity for animal and vegetable fibre. With the protoalts such distinction does not exist.

In commercial tin the following impurities are found to exist, viz.: arsenic, antimony, bismuth, zinc, lead, copper, and iron. All of which are more or less dangerous according to circumstances. They are extremely objectionable in scarlet spirits, and in the use of such spirits as fasten light and bright colors. In fact no inferior quality of tin should be used either in dyeing or printing, as such must necessarily lead to failure, disappointment and expense.

(To be continued.)

Dyeing Recipes.

ALIZARINE VIOLET ON CALICO.

Color,—

- 1 pint Standard.
2 pints Thickening.

Standard,—

- 1,000 grammes Alizarine, 20 per cent. for violets,
1,000 " Water.
10 litres Thickening for violet.
222 grammes Acetate of iron at 12° Be.
412 " Acetate of calcium at 15° Be.
(1,000 grammes are equal to one kilo.)

Thickening for Violet,—

- 10 kilos Starch.
32 litres Water.
16 " Tragacanth Water.
54 " Acetic acid, at 5° Be.
1 " Olive oil.

ALIZARINE ROSE ON CALICO.

The pieces are padded in solution of Turkey-red oil (druse) at 5 to 8 per cent., then dried.

- 1 gallon Thickening.
1/2 " Standard.

Thickening,—

- 2 lbs. 3 ozs. Water.
61 " Starch.
21 " Acetic acid, at 8° Tw.
3 1/2 fluid ozs. Tragacanth water.
1 1/2 " Olive oil.

Boil, and stir till cold.

Standard,—

- 2 lbs. 3 ozs. Thickening.
21 " Alizarine, 10 per cent.
1/2 " Acetate of alumina, at 15° Be.
1/2 " Acetate of calcium, at 13° Be.

Print, steam, and finish in the ordinary way for rose articles.

CHROME PUCE ON CALICO.

- 1,900 grammes Water.
600 " Starch.
250 " Light gum substitute.
600 " Cachou liquor, at 12° Be.
1,000 " Bimas extract, at 20° Be.
500 " Quercitron, at 14° Be.
1,400 " Acetate of chrome, at 16° Be.

After passing through chrome, soap half an hour at 130° F., wash, soap again if necessary at 160° for half an hour, and then wash.—
Eng. Textile Manufacturer.

(Specially Translated for the TEXTILE COLORIST.)

Salicylic Acid in its Application to Woolen Stuffs.

BY DR. F. VON HEYDEN.

The tests heretofore made with salicylic acid in the branch of woolen stuffs have finally produced the following favorable results:

As regards yarns destined to be kept on hand for a considerable length of time, in order to prevent the wool therein employed from becoming mildewed or musty, they were, prior to their being worked on the carding-machine, subjected to an oiling with an addition of salicylic acid, say in the proportion of one part of salicylic acid to five hundred parts of oily matter. After a certain length of time, the yarn thus manipulated, remained free from the above mentioned inconveniences, while no odor of rancid oil such as usually arises, was perceptible.

Cloth goods when in pieces, may, if exposed to the action of salicylic acid, be preserved much longer than they could be formerly from the loss of lustre, deterioration and mildew, by soaking the cloth during the final wetting process in a liquid solution of salicyl (about 1,500). In repeating the wetting

process after the admixture of the salicylic acid, the latter would be thinned out or diluted.

The finishing substances, principally applied to cotton goods, such as loam, weavers' paste, etc., emit, particularly in hot water, an obnoxious and almost intolerable smell, and are moreover, subject to putrefaction. An admixture of about five grammes of salicylic acid per litre, will prove effectual against these inconveniences; besides being attended by this advantage, that warps kept for some time on the loom neither become mouldy nor contracted mildew.

In pursuance of what more recent trials indicate as an advantageous mode, large calico printing establishments prevent the mildewing, mouldiness or mustiness, and as well as all other offensive emanations from the goods, by an admixture of about five grammes of salicylic acid per litre of finishing stuff.—*Reimann Farber Zeitung.*

Color Treatment.

The *Carpet Trade Review* in a late number, gave some suggestions on the harmony of colors, and mistakes made by carpet weavers, that we really feel as though the writer by striking a sympathetic chord, gives us back our own opinions. The authoress, (for "Betsey Bobbett" is the name), speaks out her (and our) mind, in very distinct Saxon English. She says: "I have wondered, when examining the stocks in the retail carpet houses, how a professed designer can possibly produce such shocking antagonisms to harmony as are common in our carpet products. A child can discern a glaring fault in color; yet many of our large manufacturing concerns are daily producing patterns which are horrible abortions of art treatment.

"I don't think that American art is so faulty in this respect as English art; indeed, most of the coloring inconsistencies I refer to are from the English mills; but too little attention is paid in this country to color effects. As regards American industrial art, so far as carpets are concerned, I observe that the designing of a pattern is more correctly treated than the coloring. It must be known that black, white and gold are neutral as regards gold, will act as a yellow; but it is generally as a neutral in decorative work, and it is more of a neutral than a yellow, for both red and blue exist largely in it. The pictorial artist frames his pictures in gold because, being a neutral, it does not interfere with the tints of his work. It has further advantage of being rich and costly in appearance, and thus of giving the impression of value where used. Yellow and purple colors not only harmonize, but yellow is a light color and purple is dark. These colors not only harmonize, but they contrast as to depth, the one being light and the other dark. The limit of each color, wherever these are used in juxtaposition, is therefore obvious. It is not so with red and green, for these harmonize when of the same depth. This being the case, and red being a glowing color, if a red object is placed on a green ground, or a green on a red ground, the figure and ground will appear to "swim" together, and will produce a dazzling effect.

"Color must assist form, and not confuse it. It will do this in the instance just named if the figure is outlined with a black, white or gold, which would not detract from the harmony. This is a fault in coloring altogether too prevalent. I saw a glaring example of this in a Worth street extra paper recently. I was very much surprised I admit, because the make is supposed to be above reproach. Examine, my dear colorists, the tints of the Bigelow Company's goods; I'm sure I don't know who their designer is, but his taste, if he superintends the coloring, is certainly infallible. The Sloanes, John Orne, William Kendall; these gentlemen never would select a design with faulty coloring.

"Whether they have a thorough knowledge of the subject as an art, or an instinctive faculty of judging and pleasing their own innate aestheticism, I do not of course know; but if the manufacturers would improve their business, they will certainly employ some one who is capable of judging of color harmony in a carpet pattern, before it is put upon the loom. How many manufacturers have put a carpet before the trade which is immediately condemned; and for what reason? simply on account of its coloring. No matter how beautiful a design may be in the outline drawing, poor coloring will ruin it; whereas good harmony in color will often make a "go" of an execrable drawing. Look again at a figure of blue upon a red ground (as ultramarine on carmine). It would never do to allow this. The effect would be bad; and yet I see it every day in those great clumsy English tapestries, which show us roses as big as a barrel, and running vines the size of a log. I saw such a pattern, if the blue figures were bordered by a line of black, white, gold, or a light blue, the effect would be charming. It must not be imagined that by using the harmonizing border, it merely renders an unpleasantness endurable; it does more, it brings about the most beautiful effects. A carmine ground, for instance, ornamented by a bold green figure with gold outline, if properly managed, is truly gorgeous; and were the figure blue on the red ground, the lavish use of gold would render the use of yellow unnecessary, as the yellow formed in the eye and cast upon the gold would satisfy all requirements.

"It is a curious fact that the eye, if assisted by proper coloring before it, will create any color of which there is a deficiency. The color created however, is of little use to the composition, unless white or gold is present; if, however, there be white or gold in the composition, the color which is absent or is insufficiently represented, will be formed in the eye and cast upon these neutrals, and the white or the gold will assume the tint of the deficient or absent color. While this occurs, as was demonstrated to me by a prominent tapestry designer, it must not be supposed that a composition which is incomplete in harmonious coloring, is supplied with the deficient tints by the observer's eye, not at all. It is only in some cases where nature supplies the short-comings of the colorist.

"When black and blue are in juxtaposition, the black becomes rusty, or of an orange tint. Let a blue spot be placed on a black silk handkerchief, and no matter how black the silk is, it will appear rusty. This is a fact, but we sometimes want to employ blue on black, and want the blue to look black, and not an orange black. How can we do this? Obviously by substituting for the black a

dark blue or indigo. Visit the Indian Museum at Whitehall, England, and examine the beautiful Indian shawls, scarfs and table-covers, or if unable to do so, look in the windows of our large dry-goods stores in New York, and see the genuine Indian fabrics, and observe the manner in which small portions of intense reds, blues, yellows, greens, and a score of tertiary tints are combined with white, black and gold, to produce a very miracle of beauty, so rich, so perfect, so harmonious. It is curious that we never find a purely Indian work otherwise than in good taste as regards color harmony.

"Indian works in this respect, whether carpets, shawls or dress material, or lacquered boxes, or enameled weapons, are almost perfect: perfect in harmony, perfect in richness, perfect in the softness of their general effect. How strangely these works contrast with ours, where a perfect work in colors is rarely seen."

Chemistry as an Art and as a Science.*

BY PROF. J. M. ORDWAY.

The past year has been one of laborious activity in chemistry, but it has not been marked by any epoch-making discoveries. Meyer's recent apparent resolution of the chlorine molecule has not, indeed, been verified by the carefully-devised experiments of Crafts, but the latter does seemingly confirm the change of iodine by intense heat.

The years 1879 and 1880 will rank hereafter as years in which Meyer found means to throw new light on the nature of the haloids. Twenty-four years ago Perkin sought for artificial guanine, and found instead a better than royal purple. Then by various hands and in rapid succession, red and yellow and black and brown and blue dyes were brought out from what proved to be something more than aniline. Now the novelty is passed, and the announcement of a new dye hardly creates a ripple of excitement. The twelve-year-old synthesis of alizarine has given us colors purer, brighter, faster, and cheaper than those of the obsolescent madder.

Of late, wool has been provided for, and the extinction of cochineal plantations is threatened by reds of surpassing brilliancy, durability, and ease of application. Bayer has recently effected the synthesis of indigo, and tropical indigo fields may in time share the fate of the madder farms of France and Turkey. But indigo itself will not continue to satisfy our demand. We have been accustomed to hues of a delicacy and richness that no one dared to dream of twenty-five years ago. The æsthetic taste of this generation has been too much pampered; and dyers will soon call for something nailing the brilliancy of the aniline blues with the fixedness of indigo, and its adaptiveness to wool and cotton. And Germany, which has done the most in studying out these extraordinary colored compounds, now furnishes the most of the industrial fruits of seemingly unpractical researches. Investigation costs, investigation pays; in more senses than one our science "opens wide her ever during gates on golden hinges turning."

The passing years are bringing to light new elementary bodies, and new metals are becoming like new asteroids, of too little mass to influence the orbits of other planets, and too much out of sight to interest many. Within five years fourteen new metals have called for recognition; and in 1879 alone chemists have claimed the discovery of six. Of new alloys, manganian copper is worthy of regard, since it may in a measure play the part for copper that *spiegelleisen* does for steel. In 1620 Bacon published the second part of his "Novum Organum," wherein he pointed out the way to appeal to

nature by experiment, instead of deriving all science from the teachings of the ancients. But his methods had little immediate influence on the science of the time. He relied on induction; and induction alone simply strings together dry bones. That preception of general principles which makes science comes not altogether from the mere collation of facts. We need something more than eyes to see.

The great chemist of two hundred and fifty years ago was Van Helmont. To him we owe the word gas, which he derived not from *geist* but from *chaos*, as representing the original form of matter. When our forefathers was laying the foundations of this nation alchemy was in its dotage, and chemistry took its rise in a dim knowledge of the gasses. The evolution of chemistry as a science was three-fold. First the study of the gasses, then the study of combining weights. Consider how much we know depends upon the gasses that Cavendish, Black, Scheele, and Priestley revealed. The study of combustion, respiration, vegetable growth, organic decay, geological transformation, and hygiene involves the study of carbon dioxide. Carbon monoxide reduces the metals and plays a part in the Bessemer process for making steel. The fuel of the future is to be coal resolved into a chaos of carbonic oxide and hydrogen.

At the end of the last century Murdoch found a use for coal gas, and in its train came a host of secondary products having a marvelous effect on science and industry. A test came into chemistry when Beecher attempted to explain combustion. Vauquelin of old made as good iron as the blacksmith requires to-day. As for quantity, Vulcan, with all his Cyclops and the fires of *Ætna*, could not produce as much in six days as the Cambria iron works turn out in six minutes.

Glauber, with all his good sense, taught that the rays of the sun and stars shoot themselves into the earth, and finally became gold and silver. Perhaps he was a prophet, speaking in symbols which he understood not. Now we know that metallurgy does depend on the sun's rays. The sunshine of the carboniferous period has been materialized into coal beds, and now retain perfection in a metal of more real value than gold. In the chemical study of heat, Berthelot's recent work shows culminating progress, and is worthy of him who years ago almost created organic synthesis.

After a review of some of the most obtuse speculations in theoretical and physical chemistry, Professor Ordway went on to discuss the importance of biological chemistry. This branch is yet in its infancy, and has few to tenderly care for it. Most chemists prefer to take easier subjects, but the interest in it is increasing. The field is large and there is room for many laborers. Proximate organic analysis still remains undeveloped, and the world does not comprehend the light we already have.

In fermentation, putrefaction, vitrification, and zymotic diseases, life may intervene; but how much do we yet know as to what is cause and what is merely concomitant? It is pertinent to ask whether chemistry tends, as many think all physical science tends, to materialism. I believe no true science tends that way; it is the lack of liberal cultivation that leads to such dimness of vision. Materialism is no more prevalent now than among the Athenians, who had no physical science. We hear much of the culture of that people, as if æsthetics were the only science and floriculture the only culture.

There is much in the training of the chemist to foster a wholesome skepticism and just intolerance; intolerance of human pride and skepticism of airy theories. In chemical practice the constant appeal to sensible tests and the precision of the balance checks reliance on hasty assumptions. The chemist soon learns that exact truthfulness in others and rigid honesty in himself lie at the very

* From an address before the American Association, Boston, 1880.

foundation of science and real knowledge; and he looks on laxity in experiment or statement as the unpardonable sin. No other subject is so well calculated to impress one with the idea that theories are but the changeable dress of science. We all wonder what will become of the atomic theory itself when its centennial comes round twenty-seven years hence.—*Scientific American Supplement.*

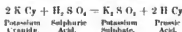
Application of Chemistry to Textile Art and Dyeing.

(Continued from page 193.)

CARBON AND NITROGEN.

There is no known method by which carbon and nitrogen can be combined directly. But by indirect process they may be united, thereby giving rise to a large class of substances known as cyanogen compounds; because their composition may be most readily explained by assuming in them the existence of a radical cyanogen, the symbol of which is C N, or more frequently abbreviated Cy. (The term "radical" is used to designate a group of atoms; in this case of carbon and nitrogen, which act as a unit, remaining together unchanged in a series of reactions, and behaving in many ways like a single element). We are, in fact, well acquainted with this radical cyanogen, and can prepare it to be heating mercury cyanide Hg Cy. In this, as in all experiments with these substances, the utmost care and caution must be exercised, on account of the insidious and dreadfully poisonous character of many of the substances. Cyanogen is a gas, soluble in water, and burning with a purple flame.

Prussic or hydrocyanic acid H C N or H Cy, is a compound of cyanogen and hydrogen, a dilute aqueous solution of which may be obtained by treating potassium cyanide (cyanide of potassium) with dilute acids, dilute sulphuric acid being generally taken.



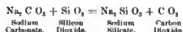
By another and quite a different process, unnecessary to describe, pure anhydrous hydrocyanic acid may be obtained. It is a colorless and very volatile liquid, having a strong penetrating odor of bitter almonds. It is the most dangerous of poisons, a few drops of it being sufficient to cause immediate death, and the inhalation of its vapor is not less dangerous. As prussic acid is produced also by the action of strong acids on potassium ferrocyanide or ferricyanide (yellow or red prussiate of potash) the dyer must be exceedingly careful when he brings these chemicals together, as in blue dyeing, and should alike beware of introducing his hands into the bath, or of inhaling its vapors. Prussic acid is also found in bitter almonds, peach kernel, cherry and laurel leaves, etc., by distillation with water.

Metals may replace the hydrogen in hydrocyanic acid, and salts are thus formed, known as cyanides; K Cy, potassium cyanide and others, with which the reader will be better acquainted further on.

Silicon Si=21.—Silicon is an element in many respects resembling carbon, and, like it, exists in three different conditions, viz, the amorphous, graphitoidal and crystalline. In none of these states does it occur in nature, nor has it been applied to any practical use, as prepared in the laboratory. The most important

of its compounds is silicon dioxide, Si O₂, also called *silica* or *silicic acid*, a compound of silicon and oxygen.

It occurs in nature in a pure state as crystallized or amorphous quartz, and less pure as sand-stone, flint, etc. In combination with metals it forms, a very large proportion of the rocks that make up the solid crust of the earth; silicon occurs in two modifications. As found in nature, as quartz, it is a white solid, insoluble in water and in any acid except hydrofluoric acid; being infusible at any but the very highest temperature which can be produced artificially; but we are also acquainted with amorphous silicon, which chemically departs itself in a very different manner. Preparing it requires that finely powdered quartz or white sand be fused with soda. When the fusion commences, the silica combines with sodium, to form sodium silicate, and carbonic acid is set free and escapes with effervescence:



The fused mass is soluble in water, and on adding hydrochloric acid to this solution, the larger part of the silica separates as a voluminous, gelatinous mass; while another portion remains dissolved in the liquid. If the latter be entirely evaporated and treated with water, a white powder remains behind, which is amorphous silica. If the solution of sodium silicate, (of which the so-called water-glass, liquid quartz, silicate of soda, etc., of commerce are merely varieties), contains certain coloring matters, such as fuchsine, etc. The silica on being precipitated by dilute hydrochloric or sulphuric acid, will combine with them, and forming an insoluble compound, carry them down with it, and the precipitate will be colored according to the nature of the dye-stuff. If a textile fibre, say cotton, is introduced into a solution of sodium silicate and coloring matter, and dilute acid be then added, the colored precipitate will be formed within and upon the fibre, and color the latter. In this manner silicic acid acts, as it were, as an agent for fixing the coloring matter upon the fibre, as a necessary agent in effecting the union of the two. Such substances are called "mordants." Silica has only recently been put forward as a mordant, and its possibilities as such are quite undeveloped.

(To be Continued.)

Vert Helge appears to be a new trade name for the fast greens which dye in an acid beck. They may, if desired, be used along with extract of indigo, picric acid, and sulphuric acid, as well as alone, thus producing many useful shades on wool, which are dyed at a boil.

WANTS.

Manufacturers desiring help in any department, or persons seeking employment, can have their wants advertised in this column for the low rate of 50 cents per line. No other advertisement will be admitted in this department.

WANTED.—A situation, by a first-class practical piece dyer on fancy muslins, worsted, broadcloth, beavers, etc.; also, on fancy hosiery. Has thorough knowledge of blue dyeing, both on wool vats, potash vats, and potash indigo. Best of references. Address, B. F. U., care of Textile Colorist, 506 Arch St., Philadelphia, Pa.

WANTED.—A first-class dyer will be open to an engagement on the first of August. Thoroughly understands the dyeing of cottons and wool and wooden pieces. First-class references. Address, F. R. care of Textile Colorist, 506 Arch St., Philadelphia, Pa.

WANTED.—Situation by a Bradford place dyer. Address, P. D., care of Textile Colorist, 506 Arch St., Philadelphia, Pa.

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RECIPES BY WHICH THE ANNEXED SAMPLES WERE DYED:

RED.—100 lbs. of clean Wool are mordanted with 24 lbs. Alum and 6 lbs. Gray Tartar. Boil slowly for 2 hours; steep for 12 hours; lay aside for 24 hours.

No. 1.—8 lbs. Sumac,
1/2 lb. Flavine,
2 lbs. Chalk.
Boil for 10 minutes, cool the liquor down to 150° F.

Then add 8 lbs. Art. Alizarine, W. Y. Enter the wool, raise the heat to a boil in 1 hour, boil for 1/2 hour, let steep for 2 to 4 hours before drawing off the liquor.

No. 2.—Mordant as above and dye with 8 lbs. Sumac,
2 " Chalk,
10 " Art. Alizarine, W. Y.

MAROON.—100 lbs. of clean Wool are mordanted with 14 lbs. Bichromate of Potash and 2 lbs. Red Tartar, boil for 2 hours.

No. 5.—10 lbs. Art. Alizarine, W. B.
6 lbs. Sumac,
2 lbs. Chalk.

No. 3.—Same proportions as for No. 2, using W. Art. Alizarine instead of W. Y.

No. 4.—Same proportions as for No. 2, using W. B. Art. Alizarine instead of W. Y.

No. 6.—Same proportions as for No. 5, adding 5 lbs. Extract of Fustic.

BROWN.—100 lbs of clean Wool are mordanted with 2 lbs. Bichromate of Potash, and 4-lb. Sulphate of Copper. Boil for 1 1/2 hours.

No. 7.—6 lbs. Art. Alizarine, W. B.

9 " Extract of Fustic,

6 " Sumac,

2 " Sulphate of Iron.

Boil for 1/2 hour; steep 4 hours.

BLACK.—100 lbs. of clean Wool are mordanted with 12 lbs. Sulphate of Iron, 4 lbs. Sulphate of Copper and 4 lbs. Red Tartar.

No. 8.—7 lbs. Art. Alizarine, W. B.









44 " Logwood,

6 " Fustic,

6 " Sumac,

" Chalk.

Boil for 1 1/2 hours; steep 2 hours.

No. 1.	No. 2.	No. 3.	No. 4.
			
No. 5.	No. 6.	No. 7.	No. 8.
			

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TEXTILE COLORIST.

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No. 22.

The Manufacture of Ultramarine.

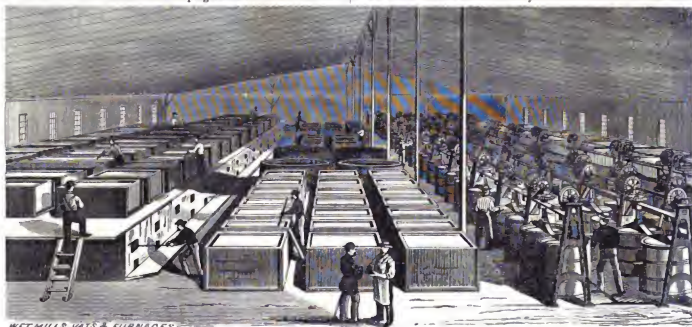
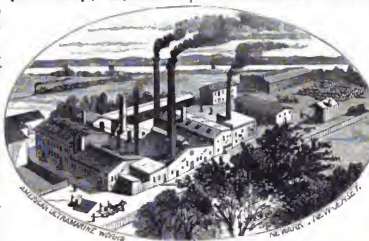
One of the most expensive of the pigments in time past was Ultramarine. It was, in fact, made from "lapis lazuli," one of the precious stones found in some parts of Europe, Asia, and South America. Such was the value set upon it that its price went as high as \$200, and seldom as low as \$50, per pound. But chance changed the market of this precious pigment, and chemical investigation has reduced it to a reasonable price, and brought it within the ready reach of the arts. Guimet, a Frenchman, in 1828 gained the prize of 6000 francs offered four years previous for an artificial Ultramarine. Keeping his discovery a profound secret, Guimet, with commendable liberality, continued to reduce the price of this admirable pigment until he made it as low as \$3 a pound—a wonderful fall from \$200 per pound, its former price!

Such has been the successful progress of this artificial Ultra-

pound. One-tenth of which sum is manufactured by Messrs. Heller & Mertz, whose extensive factory at Newark, N. J., we here describe, with illustrations.

The manufacture of Ultramarine, like too many other manufactures in this country, was prolific of failures for many years, owing to the far greater expense of production here than in Europe; and there being in those days no protective tariff, at the same time that labor, chemicals, and other expenses were so high as to render competition an entirely hopeless adventure. In the fall of the year 1869, however, one more effort was made by a new firm, Messrs. Heller & Mertz, and this time with full success. In Newark, N. J.,

this company commenced to manufacture Ultramarine in a building of comparatively small dimensions, and with such devotion to their object and energy in its accomplishment as to guarantee success from the outset. In four years their business increased so



marine that although Guimet turned out 120,000 pounds per year, there are now thirty-four Ultramarine factories in existence in the world, whose aggregate annual production is twenty millions of

rapidly that the dimensions of their factory (50x125) were found to be wholly inadequate, and they were necessitated to purchase a large lot in the eastern suburbs, which they continued to enlarge

and build upon until their works spread over fully three acres. These works consist of seven large buildings, besides many minor ones.

with finely powdered sulphur or under influx of air in pans and retorts. The light shades are called *cobalt ultramarine*. From the fact that large quantities of glauersalt and sulphured soda are



The power is supplied by a fine new steam engine of 250 horse-power, and, as reserves, two steam engines, one of 100 and the other of 50 horse-power, which have hitherto done the work. The hands employed number 100.

The following are the ingredients which enter into the manufacture of Ultramarine:

1. Kaolin, glauersalt, coal, or resin. 2. Kaolin, soda, silica, sulphur, and resin. 3 is made by the mixing of the two former, with or without silica as shades may require.

The raw material is first reduced to an impalpable powder by being ground between burr stones. It is then mixed, pressed into crucibles or mufles of sufficient size, and calcined at a red heat in furnaces for from 12 to 36 hours, according to requirement. The burning

out of the sulphur is proof of the firing being finished. This is carefully watched through holes in the brickwork. On ascertaining the fact, the furnaces are closed nearly air-tight and allowed to cool off slowly, say from five to six days. On re-opening the furnace, if glauersalt has been used, the material will present a dark green hue.

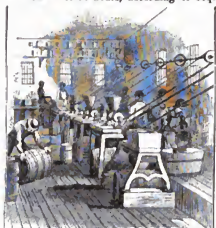
Very dark blue will be

formed, both descriptions should be very well washed, and subsequent to such washing the Ultramarine is ground for from two to five days in wet mills. The grinding being finished the pulpy mass

is run into large iron tanks, refined under the influence of heat and of various chemicals, then repeatedly washed in large vats, and finally, after separating the various grades of fineness, dried in ovens, baled and packed.

It is a fact that we take pride in, as Americans, that with very few exceptions of brands, in themselves rather unusual, the qualities of Ultramarine turned out by the Messrs. Heller & Merz

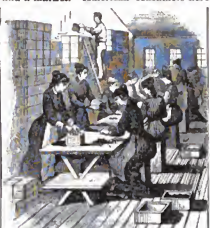
works are fully as good as any imported; the direct proof of which is that they never fail to find a market. American consumers here



the color if mixtures 2 and 3 be used. For the purpose of producing the lightest shades of green Ultramarine, it must be roasted

find an article which, unlike many European products, is perfectly pure and free from adulteration. For which reason the Ultramarine manufactured at the Newark mills ranks high and its share of the general supply for the world is so remarkable.

Paper-makers find the chemical qualities of Ultramarine of much importance in their line, as they use the article to give the paper a white or a bluish tint. Care is necessary on account of the presence of alum, giving an



acidity tending seriously to the destruction of the Ultramarine; to make it resist that action, is effected by using in the raw material a larger amount of silica. But in fact it is quite impossible to make Ultramarine acid-proof, although the article put upon the market by Messrs. Heller & Merz is much more acid-proof than any of its European competitors. The test in reference to alum is made by the exposing of equal quantities in test tubes.

The chemical action will soon set in, especially when the tubes are put in warm water, sulphureted hydrogen will evolve, and the Ultramarine will change its color to a bright blue and grey. That sample which holds out longest is the best for paper, if the coloring strength is uniform. The coloring strength is tested by mixing equal quantities of the Ultramarine with about ten times its weight of finely ground barytes or gypsum upon paper with a spatula, taking due care to weigh the quantities very exactly, and not to press too hard with the spatula. The sample showing darkest when thoroughly mixed is the strongest, if we take into consideration its bluish or reddish shade.

Ultramarine is a much better bluing agent than either soluble blue or aniline on account of its far more beautiful tint and its bleaching qualities. Soluble Prussian blue especially, will impart a yellowish, rusty tint, after continuous use. In using Ultramarine for this purpose it ought to be strained through a fine cloth, and not be permitted to settle lest it should spot. Ultramarine ranges from 10 to 30 cents per pound in price for large quantities. Some extremely fine qualities range as high as a dollar. Violet Ultramarine is made by exposing unground blue Ultramarine to chlorine gas under high temperature to diluted nitric acid vapors. Both kinds are sparingly used.

The price of Ultramarine has been gradually declining since its commencement in the United States, and notwithstanding the high tariff on the foreign product it is actually reduced in price. However, it is unquestionably the favorite in the competition with the European article, and as long as the establishment of Heller & Merz continues our national pre-eminence may be relied upon.

The illustrations here given show: 1. A bird's-eye perspective of the whole factory, with its surroundings. 2. An interior perspective of the Wet Mill Vats and Furnaces. 3. A front view, in perspective, of the Calcining Furnaces in operation. 4. An interior perspective of the Dry Mills. 5. The interior of the Oil Paint Department. 6. Interior of the Blue Department. 7. The Bolting and Packing Department.

Besides these buildings are several others of the utility class, such as carpenters' and coopers' shops, and a large pottery for turning out crucibles, of which many thousands are used in the year. A large store-house, sheds and stables, aid in completing this im-

portant factory in which the busy hum of industry accompanies the thorough-going system which has overcome prejudice and completely conquered all obstacles that once offered defiance to the manufacture of Ultramarine.

This successful manufacture of Ultramarine is a very decided proof of the ability of this country to produce within herself most, if not all, of the requirements of a nation desirous of taking a leading position in art, as well as science. It only requires the determination to succeed shown by many of our people, and by none more so than by the gentlemen whose interesting manufactory we have just called the attention of our readers to.

When Messrs. Heller & Merz commenced the building of their present factory, it was on reclaimed ground, and they had to contend, along with their other impediments,

with unhealthiness of their employees, arising from the miasma pervading the swampy location they worked in. But even this has been overcome, and it is said that the fumes of the sulphur used in the factory have had the beneficial effect of rendering the whole location healthy, and, in consequence, it is now being thickly built around with the dwellings of the numbers who belong to the factory and those attracted to the neighborhood.

Practical Tests on Chlorozone.

The quilt blenchery of the Brighton Mills, W. 23d St., New York, has successfully applied Chlorozone as a deterging and bleaching agent without the preliminary boiling of the goods. The quilts coming from the loom are immersed with agitation in a bath made by 50 parts of cold water for one of pure Chlorozone at 50° Chlorometer. After 6 or 8 hours the deterging and bleaching operation is simultaneously accomplished. A thorough rinsing in the ordinary Butterworth wash vats delivers the quilts in a perfectly pure white. No cotton specks, no spot, no weaving oil, can be detected, and the fabric is far softer and brighter than by the ordinary boiling and liming process. As the Ozone has a strong affinity for Aniline blue, the blueing is preceded by a slight souring to insure uniformity of cast. The batches of quilts so treated this week by this mill are pronounced superior to any other, treated by the ordinary ten hours boiling in soda ash and ten hours bleaching in chloride of lime. The one degree Chlorozone bath serves several times over, and the suppression of the costly and injurious hot deterging reduces the price of bleaching in giving a better result every day. The same application of Chlorozone has been also made satisfactorily at the shirt factory of R. K. Davis & Co., opposite the Brighton Mills, W. 23d St. The shirts brought from the factory were directly placed in the washing machine with a bath made by 100 parts of cold water for one part of Chlorozone, and without soap. Every ten



BOLTING & PACKING

minutes a bath of three dozen shirts was dispatched, far whiter and purer than by the ordinary hot soapy bath. The same bath of Ozone was used over three times, with equal result. The bath being then forcibly reduced in liquid from the absorption of the lime, it is necessary to renew it. Everything calculated, Chlorozone brings here over 50 per cent. savings in every way—money and labor, with less complication and superior results.

The Delmonico restaurant hotel, of Fifth Avenue, has washed with Chlorozone 1,000 pieces in two hours. The same job takes three-quarters of the day with soap and hot water. Whiteness, purity and softness are attained far better with it than by the use of soap and costing only one-half!

The Empire Dyeing and Cleaning Co., W. 39th St., bel. 11th Avenue, has adopted Chlorozone with similar satisfactory results. They clean and bleach curtains perfectly well in a half hour, with two cold Chlorozone baths, and without machinery. They produce a slight agitation with sticks and hands.

Various other establishments and laundries have eagerly adopted this new agent, and many cotton and linen mills are experiments with it. Wherever the application is correctly made, success is certain, and a cheerful adoption is sure to follow. The principal characteristics of Chlorozone are that it operates better on raw produce from the loom, or from the spinning-wheel, than from the boiling kiers. The Calcium Salts and Carbonic Acid generated by this crude process on the fabrics (very often boiled to death), are antagonistic to Ozone, and the operation works slower when the fabric has been boiled. But any ordinary cotton, jute and linen goods, direct from the factory, can be superiorly treated by Chlorozone, and with a considerable economy in boiler, fuel, chemical, labor, time, room, and in fuss about the mill.

Another point to observe about the use of Chlorozone is that a gentle agitation, such as that given by the Oakley & Keating washing machine (Courtland St., N. Y.), considerably shortens and equalizes the process.

The Passaic Print Works are preparing to apply Chlorozone on their calico before boiling. A preliminary test proved that calico can be treated by 75 to 100 parts of water for one of Chlorozone. The suppression of boiling, at that rate, would bring a considerable saving. There is no doubt that the affinity of Ozone to coloring matter may prove beneficial to the printing, both in quality and economy. Another application of Chlorozone is made on deterring woven corsets. The Novelty Corset Works has applied it to remove the black streaks of imperfect weaving in the body of the corset.

We will keep our readers posted on the progress of this extraordinary reagent, which works quicker with less injury to the fibre than any other in use.

Use of Mordants.

BY PROF. J. F. ELSOM.

In the long and interesting catalogue of native coloring materials, it matters little by what name they are recognized or known. In the majority of instances an intervention of another class of constituent elements, entirely foreign from both the matter itself and

the fabric to be colored, is indispensably necessary. These elements are called mordants by the majority of dyers, and as such we will speak of them in this paper. In fact, we of the present age can accord the discovery or coinage of the word to no one; for away back amid the mists which measurably obscure the past, the word is found in manuscript copies of dyeing receipts for use in an age when the art of printing was unknown, not even thought of. Nearly of equal age, then, of dyeing, the origin of mordants claims birth. Then it was known as an adhesive composition, by means of which gold leaf could be attached to wood, marble, or metal. Early dyers appropriated the word to designate a substance by means of which coloring matters could be made to adhere to fibres, and it has been retained in that sense in all modern treatises upon dyeing.

Among the principal mordants used in dyeing, so far as I have been able to ascertain, is aluminum salts, iron, tin, chromium, copper, and a few other minerals. When a decoction of any coloring matter, say logwood or cochineal, is heated with a small quantity of a properly selected salt of one of these metals, it is found that the coloring principle loses its solubility, forms a combination with these metallic salts or bases, and precipitates to the bottom of the solution, thus leaving the supernatant liquid nearly or quite colorless. This precipitate, then, of which I speak, is generally called the "lake" of the particular metal and coloring matter, which are now in a state known to chemists as chemical combination. These lakes are insoluble in water, and are only divided again into their constituent elements by the action of some powerful chemical agent.

These ready-formed lakes, however, are incapable of imparting tints to fibre usually, for the reason that they are insoluble in water and not easily soluble in any menstruum which can be applied to such material with any degree of safety. Of themselves they are of too gross a nature to penetrate and permeate through the minute interstices of the fibre; hence, when brought in contact, rest, for the most part, upon its surface, and are therefore easily removable by washing or mechanical friction. It is known, however, that for some colors in calico printing, lakes can be applied, but then only in conjunction with acid salts, and at a high temperature, by mean of which a sort of solution is obtained while in contact with the fibre itself. The part which chemists have acted in this important department of a nation's industries has been, and is now, to so arrange these three elements—fibre, metallic salts, and the coloring matter—that from the substance thus formed may be obtained a fourth combination in the form of an insoluble colored lake within the body of the fibre itself, whereby, either by the lake being mechanically retained or chemically combined, the fibre assumes a permanent or fast color.

As to the application.—This consists of three principal ways in which the mordant and the coloring matter can be brought in contact with the fibre, the developments and modifications of which constitute the whole art of dyeing.

A recent scientific and practical dyer, among other good things of interest to the entire craft, speaking of these processes, claims that by the first method, which is by far the most common, the fibrous matter is separately impregnated with the mordant, which

is by various means decomposed, so as to deposit its base in an insoluble state upon or within the fibre, the coloring matter being applied at some subsequent time. Take for example, the case of dyeing a common black from logwood upon calico, which, as all dyers know, has no affinity for the coloring matter of the logwood. The first process is to pass the calico through a hot aqueous solution of sulphate of iron, sometimes mixed with acetate of iron, and to remove the excess by passing the cloth through rollers; the cloth, either previously dried or not, is then passed through the mixture of lime and water, which has the effect of decomposing the iron salts and liberating the oxide of iron. A washing in water to remove the excess of lime or any loosely attached oxide of iron renders the calico in fit condition to come in contact with the logwood. The calico now assumes a buff color, owing to the attached mordant of oxide of iron; when placed in a hot decoction of logwood speedily acquires a dark hue, and in about half an hour has become dyed of a dense black color, and when smoothed and finished forms the common black calico to be seen in nearly every store or shop where cloth is kept. A variety of other cases might be added: Woolen cloth boiled for some time in a solution of bichromate of potash acquires a certain amount of chromin, which enables it to take a black color from logwood and other colors from other matters. The practice of calico printing, as mentioned heretofore in THE TEXTILE COLORIST, illustrates in a very forcible manner the action of mordants. Woolen boiled with salts of tin is enabled to dye up a brilliant scarlet in a decoction of cochineal; boiled with alum, it will take a variety of colors in various dyestuffs; by the aid of an apparatus previously described in these columns, we can learn that portions of a piece of calico are impregnated with mordants, and those portions alone acquire color from the dyeing solution, and thus designs or patterns are produced upon a white ground.

The most usual method of impregnating the fibrous matter with mordant consists in beating it with the required metallic salts, and, as will be shown hereafter, those salts easily decomposed are those generally used with preference; or substances such as chalk, alkalies, or tartar, are added to some more stable salt, such as alum, to induce the formation of comparatively unstable compounds, which, under the influence of a high temperature and contact with fibrous matter undergo decomposition—the metallic oxide, or some baser insoluble compound of it, becoming intimately combined with the fibre, which is then said to be mordanted.

Another method, less general than the foregoing, is to apply the coloring matter previous to the mordant. It is resorted to only with heavy goods, which absorb a large quantity of liquid, or with light colors upon other fabrics. Dyes produced in this way are superficial in their character, and not so permanent as those produced by the first method. In dyeing by that method it is in many cases customary to add a small quantity of mordant to the dye-bath when the process is nearly or quite finished, or to pass the dyed goods, as a final operation, through a diluted mordant.

(To be continued.)

—We will pay SEVENTY-FIVE cents a copy for our first number, January, 1879.—

Suggestions on Feather Dyeing.

(Continued from page 212.)

INTENSE BLUE.

This color is a pale blue—it is sometimes, but improperly, called "Gen d'Arme." It is obtained with comparative facility upon soft, hard, or ostrich feather, by an application of indigo, carmine and archil. It is more difficult to produce it upon skins, wings and birds. Of course, much indigo-carmine and little archil should be used. Often, in order to make blacker some black varnish is added to either the acidulated bath, or to a separate or unacidulated one. This process, however, is not to be recommended—it is better to add a little more archil, and, at the same time, very little curcuma. Orange Z may also be taken.

MARINE BLUE.

This is a dull color, more or less violet tinted. It is obtained from indigo-carmine and lilac (violet is often substituted for this last color). To produce a deeper tint add a trifle more of archil. Even for very pale marine blue, nothing but indigo, carmine and archil are sometimes taken. For a flat feather, the violet is employed to advantage. As regards the ostrich, on the contrary, lilac is preferable, for the violet is easier produced, giving a more uneven color than the lilac.

The bath should be acidulated with archil, not with sulphuric acid, that being too powerful. When the feather is in the boiling bath, indigo-carmine is first poured in, and next a mixture of indigo-carmine and violet, or indigo-carmine and lilac. To deepen the dye archil is added (but in exceedingly small quantities), as it produces considerable efficacy. Time must be given, however, to produce this effect, for it is known that archil bites slowly and at a comparatively low rate of temperature. If too much archil be taken it will suffice to give the feather another boiling hot bath with indigo-carmine and violet.

The white ostrich feather of good quality easily takes a marine blue color with indigo-carmine and lilac; but that which has been used a little, and above all the grey, becomes brown, or rusty, almost inevitably, as will be seen when we shall have occasion to speak hereafter of metallic reflects.

The difference in the nature of feathers belonging to one and the same lot is the cause of a very great inequality—some feathers being more reddish or greenish than others, so that after an energetic heating it is well in drying the feathers to range them in order of tint, and treat each species separately, boiling the hardest, or those feathers not reddish enough, longest in the original bath, and giving, on the other hand, a boiling hot bath of indigo-carmine to those which are too reddish. This operation being evidently too long is unfortunately inapplicable to cheap feathers.

For skins, wings and birds, the same processes are employed. Much precaution must be had that not too much sorrel salt be used, and above all, that the process be effected as quickly as possible.

PLUM.

The plum color is a pale violet. The feather is dyed in a bath acidulated with sulphuric acid, archil, indigo-carmine and black gloss, so that an almost black garnet may be produced. It is well to add a little lilac. The feather is taken out of the bath only at

this moment. It is rinsed in pure water and then given a violet tint in a more or less heated solution of carbonate of soda. During this operation the archil turns from red to violet. Black is developed and settles more firmly on the feather, while a large portion of the indigo-carmin goes off. It is a primitive process, and certainly not economical, but which nevertheless gives good results in skilled hands, but in the hands of unskilled operators it is extremely tiresome and of doubtful success.

Second process.—This is a direct process. Plum, which is but an impure pale violet employed in a bath acidulated with acetic acid, is taken for it. The dye is deepened with greyish blue or greyish rose, according to the tint required. When a blue shade is desired, lilac is added to it; if, on the contrary, then red eosine is added. This process, which is fairly successful in light plum, is more difficult of application in dark plum. When, then, a well nourished plum is required, recourse must be had to the first described mode.

GREY.

There are a great variety of greys, resulting invariably from the mixing of any given color with black and white. It would be well-nigh impossible to describe them all; and as it would also be unprofitable, I shall limit myself to the principal kinds:

Pearl Grey is a mixture of violet-tinted blue, with very little black and much white. It is obtained by the same process that serves to make white—that is to say, by a mixture of indigo-carmin and violet. I shall not now return to a description of this procedure, and shall only state that in the personation of pearl grey the quantities of the coloring matters employed are somewhat augmented.

Giselle-Grey is a mixture of white with black. It is easily obtained by dyeing the feather with a small quantity of gloss black. As there is always a residue of yellowish hue it becomes necessary to give it a rose-color with cochineal. This operation is effected in a cold bath, acidulated with a small quantity of salt of sorrel. If it be an ostrich feather, starch is dissolved in it.

Silver-Grey is a mixture of white and blue tarnished with black in very small proportion.

Silver-Grey is obtained by employing roseate-grey and blue-grey in convenient proportions. These coloring matters are employed much diluted in a clear solution, and an acidulated bath is prepared with acetic acid or sorrel salt. The bath should be cold and, for an ostrich feather, contain starch; it should be simply cold or tepid if a tender feather is to be dyed, and a boiling heat in the case of hard feather.

Felt-Grey is a yellowish grey. It may be obtained in different ways; the following two being the principal ones:

FIRST PROCESS.

In a bath acidulated with sorrel salt or sulphuric acid, the feather is first steeped; gradually a solution augmented with an extract of chestnut-bark is poured into same, alternating with a second solution of violet. According to whether the sample has a more greenish or roseate tint, archil-juice or water rendered blue with indigo-carmin is added.

Sometimes, in order to produce a deeper dye, gloss black is

also added; this is, however, attended with the inconvenience of producing a color that will rapidly change as soon as 'brought into contact with the air. In such a case it will be better to employ, jointly with the extract and the violet, rose-colored grey.

The procedure which we have just described is very old, particularly if gloss black is taken. It is, however, attended with some serious disadvantages:

First—Difficulty of application, for one requires to be very clever to dye rapidly and well in this manner.

Secondly—The extract of chestnut-bark never gives a perfect equality, and, when taken in too large quantities, prevents the feathers from being restored in the drying process.

SECOND PROCESS

Is more recent than the preceding one, and every way preferable. It consists in employing felt-grey in connection with rose-colored grey. These two substances, of easy application, will serve for the generality of the tints in question. If it was required to produce a somewhat roseate hue, cochineal or violet might be taken; if, on the contrary, a green one, a very small quantity of indigo-carmin would be required. These coloring substances are applied, according to the feather and the tone of the color, in a cold, lukewarm or boiling hot bath, acidulated with acetic acid or salt of sorrel.

Iron-Grey, Steel-Grey, &c. These kinds of greys are usually rather darker; the tints result from a mixture of blue, a good deal of black and some white. They are obtained on the feather by means of a conveniently proportioned mixture of roseate-grey and blue-grey, the shade being subsequently imparted, as in the case of the other grey species.

(To be continued.)

Powdered Double Refined Pure Caustic Soda.

Our attention is drawn to the merits of the above article, which the Greenbank Alkali Company has, amongst its other specialties, this powdered double refined pure caustic soda, manufactured by an entirely new process, making it the most convenient, purest, and most economic form of soda possible to be obtained for any legitimate purpose. In this all dyers, bleachers, wool scourers, and consumers generally are concerned. Wherever soda ash, refined alkali, or soda crystals are used, a tenth part, or even less, of this article may be advantageously substituted, doing the work more rapidly and to much greater advantage. That caustic alkali is superior to carbonated alkali for scouring, bleaching and cleansing, besides being more economical, is a conceded fact, and yet notwithstanding it has been hitherto but little used for such purposes. The inconvenient manner in which it was made up for sale in solid blocks was one reason for its being neglected. To weigh out small quantities was certain to cause waste both of time and material. There is not a solitary trace of iron to be found in the Greenbank Double Refined Caustic Soda, and it is actually less impure than the best refined carbonated alkali or soda crystals. For convenience of handling, it is very desirable, being made up in barrels, so that the smallest quanti-

ties may be taken out without waste. The head of the barrel can be easily replaced without detriment, as the caustic soda will retain its virtues for any length of time. In fact it is the remarkable peculiarity of this finely powdered pure article that the air and moisture of the atmosphere form a thin hard crust of carbonated soda upon the exposed surface; thus effectually protecting the whole bulk from deterioration. Great caution must be used in the substitution of this powdered double refined caustic soda for soda crystals, or as it is more generally called soda-ash, that no great excess be used. In the first place, soda crystals held sixty per cent. of water of crystallization, being over half the whole weight. In the second place, the alkali contained is carbonate of soda, or alkali combined with carbonic acid, which again halves the actual contents of real soda, besides greatly retarding its action when used for scouring, bleaching and cleaning. On the other hand, this caustic soda is pure soda, uncombined with any carbonic acid, holding no water of crystallization; it is therefore evidently not alone a very concentrated soda, but is likewise ready to work in the quickest and best manner. Particular caution should be taken in using it, on account of its being so highly concentrated and exceptionally pure, as any excess will undoubtedly tend to materially injure any fibre on which it is used as a cleanser. As compared with soda crystals, one-tenth to one-twentieth only should be used, either by weight or with reference to the specific gravity.

Oil of Vitriol.

Whether under the above name, or that of Sulphuric Acid, there are few articles of more importance than this acid. The chemist and the dyer alike look upon it as one of the acids without which they would find it frequently very difficult to proceed in their operations.

Oil of Vitriol, or as it is often simply called "oil," is classed in commerce under four heads according to its relative degrees of purity. The first, or that of the greatest strength, is the fuming Sulphuric Acid, which, on account of its being long manufactured at Nordhausen (a town of Prussian Saxony), was also called by the name of that place. In times past it was prepared by distilling dried copperas at a high temperature. In the present more advanced state of chemical knowledge, we obtain it in much greater purity from the alkaline bisulphates. Its color, as a general thing, is a pale brown, and it is viscid, like oil, its sp. gr. being 1896° , or $179\frac{1}{2}^{\circ}$ T. It is composed of 80 parts, by weight, of the dry solid acid—being of two equivalents, the other equivalent being 9 parts of water. It sends forth copious fumes, and when boiled, exposed to damp air, or mixed with a small proportion of water, it is converted into common Oil of Vitriol. Its price just now is necessarily very high, and its uses very lim-

ited, being chiefly used in the preparation of extract of indigo, even in which the advantages obtained from it are doubted by some.

Rectified Oil of Vitriol is prepared in leaden chambers by a familiar process, which is often called "double oil of vitriol," theoretically consists of one equivalent, or 40 parts of dry acid combined with one equivalent of 9 parts of water. Its sp. gr., in the highest state of concentration, is 1849° , or 170° T. It is a colorless, oily fluid, whose weight is about 18½ lbs. to a gallon, and boils at 620° F. Most organic bodies are destroyed by it. It possesses the power of expelling all other acids from their combinations in the moist way. A great rise of temperature is produced by mixing it with water. One part of water to four parts Oil of Vitriol will run the heat up to 300° F. It exercises no destructive action on indigo blue, alizarin, or on the red color of madder. Straws or sawdust, if thrown into Oil of Vitriol, are at once destroyed, at the same time giving the oil a darkish hue. As Oil of Vitriol imbibes water or moisture from the air, thereby losing strength, it is highly necessary to keep it stoppered.

What we have here been speaking of is what is called "double;" now we will address ourselves to "single" Oil of Vitriol. It is slightly weaker than the double, and generally denotes from 165° to 167° T. In most other respects it possesses the already described properties of the "double," and may be applied to similar purposes, excepting the dissolving of indigo, and for that it is wholly inadequate.

Brown Oil of Vitriol, or as it is sometimes called Chamber Acid, is the Sulphuric Acid as run off from the lead-chambers unconcentrated and unpurified. Its sp. gr. is no higher than 175° , or 150° T., and sometimes lower. It has a brown color from traces of organic matter, and is more liable to contain traces of nitrogen compounds. Its strength is about 16 per cent. below the "double" Sulphuric Acid. It is liable to freezing in cold weather, and thus the carboys which contain it are sometimes broken. It must not be allowed to come in contact with indigo, but may be applied to the other purposes of the two former classes of the acid.

There are various adulterations and impurities in Sulphuric Acid; for instance, Sulphate of Lead, which is often present, is soluble in concentrated Oil of Vitriol, increasing its sp. gr., but of course adding nothing whatever to the strength. This Sulphate of Lead is easily detected by diluting a portion with pure water, when, not being soluble in dilute acid, the Sulphate of Lead settles to the bottom as a white sediment. It is rarely large in quantity, and never purposely added.

Salt Cake, which is dry Sulphate of Soda, is very often added to increase the sp. gr. of diluted acids. It may be readily detected by evaporating a part of it at a red heat,

when any alkaline salts present will be found remaining. Nitric oxide is very often present, and is, under many circumstances, destructive to coloring matters. The readiest way of detecting this is to put a portion of the suspected acid in a test-tube, or wine-glass, dropping in a clean fragment of the sulphate of iron (copperas). Should there be present the slightest trace of nitric oxide, or hyponitrous acid, a faint reddish tinge will show itself, growing gradually deeper.

Ostrich Feather Dyeing.

BY PAUL ALEX, PRACTICAL FEATHER DYER.

(Continued from page 184.)

It is possible that some of the readers of this journal think that I should write full recipes to accompany all the colors I mention. It would, no doubt, be much more interesting and perhaps profitable to them. But I do not think it would be advisable, and for the following good reasons: First, because there are no two dyers that make colors in the same way. There are not, perhaps, one in ten that would strictly follow the directions; consequently, the result would not be satisfactory, and the recipe (however good) would forthwith be contemptuously condemned. Third, there are no two dyers who use exactly the same brand of colors. For instance, take logwood; how difficult I find it to get two barrels of just the same strength. For fully six years all the colors used by me I obtained from one house, and when I began to buy from others I experienced very considerable trouble in getting satisfactory results—not because the colors were unequal in goodness to those I had been using, but because I did not understand and was not familiar with the strength and quality of them. The majority of dealers in colors know no more about the manipulation of Ostrich Feathers than a child. I am in almost daily receipt of samples of dye-stuffs that are invariably guaranteed to produce the most beautiful shades of blues, greens, reds, etc. But I find that I can use but very few of them.

I promised a few months ago to give the readers of this journal the names of all the dye-stuffs used by me, and in accordance with that promise I herewith present a full and complete list. With these I claim to be able to make any color that Art or Nature ever produced. They will be found to be about thirty in number, viz.: Logwood, Turmeric, Fustic, Shumac, Copperas, Blue Stone, Verdigris, Bichromate of Potash, Extract of Archil, Salt Tartar, Aniline Brown, Green Crystals, Cochineal, Marine Blue (bluish), Marine Blue (reddish), Extract of Safflower, Solferino, Fuchsina, Bengaline Blue, Bengaline Black (this last named color can, I believe, be found but in one house in the country), Picric Acid, Nicholson Blue, Indigo Blue, and Reddish Essence of Coffee, which last will, with the aid of acid, produce the most beautiful

shades of cream color. Of the thousands of shades of color there exists not one that cannot be made by the above list of colors.

With the six following colors, viz.: Turmeric, Logwood, Bichromate, Aniline Green, Marine Blue, and Achil, I can produce over two hundred distinct shades. I would here remark that any good artist ought to be able to produce as good colors by gas-light as by daylight.

I invariably judge the strength of my baths by taste. A man may study chemistry all the days of his life, but if he does not understand the nature of the goods he is working on, and if he is not possessed of the requisite good judgment, it is all of no avail whatever; the lack of this one qualification is fatal to his best effort. If I might make bold to take a simile from wedded life, I would say that the lack of judgment in the securing of a bride has defeated many fond hopes when she showed her true colors and proved no match for the sample.

CENTRIFUGAL MACHINE FOR DYEING, WASHING AND DRYING.—A Lyons manufacturer has patented in France a centrifugal machine in which he performs the operation of dyeing, washing and drying (or rather whizzing), without moving the yarn or cloth, and for which he claims the advantage, in the last operation, that it does not suffer by entanglement, as is very often the case where the yarn has to be moved from one machine or vat into another. The machine which the inventor uses differs from an ordinary hydro-extractor in the fact that the case or outer covering of the machine has a mantle, the space between this and the inner casing being filled with steam. The machine is also provided with a differential motion, by means of which the speed can be easily regulated at will. When used for dyeing, the dyeing liquor is introduced into the inner space, then steam admitted into the outer mantle, and the liquor heated. When this is done, the yarn or cloth is placed into the cage, and the machine slowly turned. In this manner the dye penetrates evenly all parts of the yarn, and is, after saturation, drawn off by a tap. The washing is at once proceeded with, the steam being turned off and a waterpipe turned into the centre of the machine. The water thus enters in the middle, and passes out at the circumference, washing the yarn in its exit, a tap at the bottom allowing it to run off. After the washing the water is turned off and speed put on, when the yarn is nearly dried in the usual manner by centrifugal force. It is then taken out and removed to the drying room. To enable the cage being well cleaned in case of change of color, it is made so that it can easily be taken out. The proceeding has certainly the advantage of simplicity; but it is evident to any dyer that the range of dyes can only be limited, unless several cages fit in the same machine, and are kept each for a separate color, and this, we think, would not be very economical. The idea is, however, a novel one, and may suit some circumstances.—*The Eng. Textile Manufacturer.*

THE PRICE OF Vol. 1, 1879, TEXTILE COLORIST, is \$10.00.

TEXTILE COLORIST.

Dr. M. FRANK, Manager.

PUBLISHER'S NOTICES.

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The TEXTILE COLORIST will be sent by mail to any address within the United States, on payment of the yearly subscription of \$2.00 (Postage liberally in advance), postage free. For Great Britain and Ireland, 18 shillings (British). Subscribers in foreign countries will have the additional postage added to their subscription. REMITTANCES may be made by mail by means of Post Office order or check, payable only to order of Dr. M. FRANK, Manager.

TEXTILE COLORIST, 506 Arch Street, Philadelphia.

As all our agents and solicitors are furnished by us with written authority, we request our friends not to favor those having no credentials from us.

NO SUBSCRIPTIONS RECEIVED FOR LESS THAN ONE YEAR.

WE are in want of the following numbers of the TEXTILE COLORIST, viz.: January, 1879, for which we will pay seventy-five cents; January 1880, fifty cents; July, 1880, fifty-cents.

BEFORE the next number of the TEXTILE COLORIST shall appear, the event of the now approaching election for a Chief Magistrate of our Republic will have become an historical fact. Pregnant with good or evil as this event may be, it will be the decision of the people and ought to be for the best interests of the nation at large. That the country is just now in a prosperous condition is clearly attributable to the fact that the factories are all at work turning out stock which the agricultural community readily buys up with the profits of a generous harvest having a remunerative market owing to the prosperity of the factories. And there each is to each as seller and buyer and buyer and seller, all within the limits of the one undivided country. That protection has brought this state of things about, is certain; and that the good sound policy of retaining and sustaining that protection should be the object in the coming election is most clear to all, save alone to place-hunters and those who harbor self-interest while shouting for independence. With the country in an acknowledged state of prosperity, where is the necessity for a change? None—whatever, proved principles are more reliable than untried propositions.

England and France have pressing need for asking us to take off our protective tariff, and in so doing they are true to private interests. Why should we not in refusing to do so, be true to our private interests? What would be the consequence of doing away with the protective tariff? Just this—that wages in every trade would necessarily find the European level—mills would stop and go to ruin, operatives starve for want of employment, farmers have stringent markets, the great building trade be thrown idle, railroad and canal navigation be equally unprofitable, and in fine, general ruin take the place of general prosperity! And all this to aid foreign producers to live and recuperate on our ruin. *Liberty* is a wise virtue, to be sure, but *prudence* is a far more desirable one.

Color Blindness.

DEFECTIVE VISION.

As we have in our September issue adverted to the very interesting subject of color blindness as connected with the art of Dyeing, we will now venture to pursue the theme a little farther. Color blindness in its full sense is a natural defect which is born with the individual, and consequently is an affliction which cannot be eradicated. But, there are degrees of visual weakness which are not natural, having their origin in disease produced by a neglect of the system, and of these we will now proceed to speak. The first of these defectivenesses, or deficiencies of sight, is easily traced to an unnatural state of the human system attendant on a superfluity of bile. We all know that this affects the eyes, for the yellow or bilious color is distinctly visible in the field of vision. Now, it must be evident that this state of the eye disqualifies it from accuracy of decrement in nicely defined shades of color, just as much as looking through smoked glass would, making red orange, blue green, and changing the tone of even white itself to a light buff. This erroneous vision arising, as we have said, from a bilious state of the system affecting the eye, it becomes necessary that what tends to produce such an unfortunate consequence, especially unfortunate to the eyes, should be carefully guarded against; and if acquired should be thoroughly eradicated. Some persons are more disposed to biliousness than others, and it therefore becomes a question if there be much actual correctness of judgment regarding shades and tones among men whose decision ought to be uniform. Light is another source of trouble where colors are in question. An oil-light throws a yellow tint, as does gas, in a less degree, and even lime, or the electric lights have a bluish influence as dazzling as steel, and are actually no more reliable than moon-light. After all there is no light so entirely honest and trustworthy as that of the sun, because its golden beam comes to us refined through interminable space. And yet, this very day-light is prevented by the quality of glass through which it reaches the dyer, for, there are as many different tints of color in glass as there are shades of artificial light, the predominating tint being blue.

Let dyers weigh and ponder on these few but suggestive hints, and they will acknowledge that too much care of the health of the operator as well as precaution as regards his means and appliances, as well as his surroundings cannot be had in guarding against failure in producing required shades of color, for, although the stock be unexceptionable, and the water of crystal purity, a defective vision, from whatever source arising, will be certain to entail failure on the operation, and loss to his employer.

"ANOTHER one puzzled," who writes to the *Chemical Review*, says, incidentally, "I see a drug very often used in the American TEXTILE COLORIST, 'Sal Soda.' Can you tell me what it is?" We will take the liberty of answering our English enquirer: Sal Soda is a term for simple soda, which our dyers use; custom has made the prefix a fixture, without which the article would not seem genuine. Besides, it is a mark of consideration. We are fond of titles if we are Republicans.

DYEING DEPARTMENT.

THE MONTH'S PRACTICAL RECIPES.

The following practical recipes, like all that will appear in this department, are verified as reliable and warranted to come out satisfactorily, provided the proportions are strictly adhered to, and the manipulation be workmanlike.

DIRECTIONS, NOTES AND COMMENTS.

☞ We have frequently been asked why we give the names of the makers of the aniline and dye stuffs we use when publishing the recipes accompanying our insets. The reason is: We can speak with authority for those we actually test; where anilines and dyestuffs of the same color, manufactured by other firms, may be equally good, but when treated according to our recipe, may not give similar results. In giving the names of certain manufacturers, therefore, we would not be thought partial to them. Each has his own mode of producing desired effects with his own dye stuffs.

Recipe No. 135.

METHYL BLUE ON RAW COTTON (Fast Color).

100 lbs. Cotton.

Put down for two hours in 10 lbs. Sumac.

2d Bath.—Oxy Muriate of Antimony 2° T. for one-half hour, wash well and enter.

3d Bath.—7½ ozs. Violet, } A. Poirrier, Paris.
4½ ozs. Green. } Andreykovicz & Dunk, Philada.

Enter cotton at 120° F., raise temperature to boiling and boil for one-half hour.

☞ Innumerable shades of blue can be produced by varying the quantity of Violet and Green.

Recipe No. 136.

YELLOW ON COTTON.

50 lbs. Yarn.

Turn for 30 minutes in

3 lbs. White Sugar of Lead.

Wash, wring, and finish in a fresh bath of

½ lb. Bichromate of Potash,

at 100° F.; give 8 to 10 turns, wash and wring.

Recipe No. 137.

BROWN MIXTURE ON WORSTED.

60 lbs. Worsted Brown.

Mordant with 1½ lbs. Bichromate of Potash.

½ lb. Red Tartar.

½ lb. Blue Vitriol.

Boil for one hour, wash and finish in:

35 lbs. Hypernic, }
5 lbs. Fustic, } John M. Sharpless & Co. Philadelphia.
3 lbs. Logwood. }

The mixture is 55 per cent. brown and 45 per cent white.

Recipe No. 138.

BLACK ON HOSERY YARN.

100 lbs. Yarn.

Boil one hour in

1½ lbs. Bichromate of Potash.

2d bath—60 lbs. Logwood { John M. Sharpless & Co., Philadelphia.

Give 8 turns and wash in ½ lb. Chrome at 150° F.

This black will stand fulling.

The succeeding lots only require 1 lb. Chrome.

Recipe No. 139.

LIGHT BLUE ON WORSTED.

50 lbs. Yarn.

Clear the liquor with a lot for a darker shade.

Add

1 lb. Borax,

½ oz. Blue, 5 lb. { Meister, Lucius & Bruening, Hoechts, A.-M.
Leitz & Movius, New York, Boston, and
Philadelphia.

Enter at 175° F., raise to 190° F., give 5 turns and wash.

2d bath.—Acidulated with 1 lb. Sulphuric Acid, give 5 turns and wash.

NOTE.—The second lot requires only 4 ozs. Borax and ½ oz. Blue.

Recipe No. 140.

PLUM ON WORSTED.

50 lbs. Yarn.

Dye the regular Navy Blue Bottom with

6 ozs. Nicholson Blue, R.

Wash and raise color in boiling water with

2 lbs. Sulphuric Acid.

Add

2 lbs. Sulphate of Soda,

1 lb. Alum,

½ lb. Indigo Paste.

2 ozs. Violet 250 N. { A. Poirrier, Paris.

1 lb. Archil Carmine. { Andreykovicz & Dunk, Philada.

Enter quickly and turn to shade.

☞ Any other Violet will answer for finishing; but, as this Aniline works better in connection with Sulphuric Acid than any other, it is to be recommended.

Recipe No. 141.

FAST MAROON ON WORSTED.

75 lbs. Yarn.

Boil up ½ lb. Tartar,

2 lbs. Alum,

5 lbs. Glaubersalt,

1 lb. Fast Red, R. { Badische Aniline and Soda Fabrik.
18 lbs. Indigo Paste. { Wm. Pickhardt & Kuttroff, New
York, Boston, and Philadelphia.

Cool down to 170° F., enter yarn and boil for 45 minutes.

☞ It is advisable to use the required Aniline and Indigo in two equal portions; one-half to begin with, the balance when finishing. By this means unevenness will be prevented.

(Continued on page 227.)

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PRICES CURRENT.

PHILADELPHIA, OCTOBER, 1880.

DYES AND DYE-STUFFS.

Acetic Acid.....	per lb. \$	8
Albumen, Blood.....	50	60
Albumen, Egg.....	85	95
Alum, ground.....	21	22 1/2
Alum, lump.....	5	2 1/2
Anatto, prime.....	30	40
Annattoine.....	1 30	1 50
Aniline Oil, English.....	25	30
Aniline Oil, French.....	25	30
Aniline Salt, crystals.....	36	50
Aniline Salt, cake.....	22	30
Archil Liquid, best.....	16	27
Argols, crude Sicily.....	16	20
Argols, refined St. Ant. Brown.....	28	32
Argols, refined Gray.....	30	33
Argols, refined Light.....	35	32
Aqua Ammonia.....	51	53 1/2
Aqua Ammonia, F. F. F. F.....	6	8
Aurine.....	75	90
Barbary Root.....	5	5 1/2
Barwood.....	13	12 1/2
Bich-Chromate Potash.....	13	14
Bleaching Powder.....	10	13
Borax, refined.....	21	13
Brazil Wood.....	7	5
Blue Vitriol.....	7	8 1/2
Brimstone, roll.....	31	31
Carbamide, pure.....	8	12
Carbamide, No. 1.....	20	21
Carbamide of Ammonia.....	20	21
Caustic Soda, 60 per cent.....	4	5 1/2
Caustic Soda, 70 per cent and over.....	4	6
China Clay.....	24	25 1/2
Citric Acid.....	65	100
Cochineal, Honduras.....	65	70
Cochineal, Mexican.....	55	60
Cochineal, Black Tender.....	68	65
Copper.....	1	1 1/2
Cream Tartar, crystals.....	36	38
Cream Tartar, powdered.....	36	38
Crimson Spirits.....	13	11
Cudbear, pure.....	20	28
Cudbear, No. 1.....	15	16
Cudbear, No. 1, French.....	28	28
Cuttle.....	93	100
Dyeing Oil.....	50	75
Dipping Acid.....	10	10 1/2
Extract Fustic.....	14	20
Extract Hyperic.....	19	24
Extract Indigo.....	16	25
Extract Logwood, bulk.....	9	9 1/2
Extract Quercitron.....	7	9
Flavine.....	25	30
Fustic, India.....	11	2
Fustic, Maracalla.....	11	2 1/2
Fustic, Cayenne.....	11	2
Gambier, bales.....	6	7
Gambier, ball.....	11	2
Green Ebony.....	11	2
Hyperic.....	31	4
Irish Moss.....	6	10
Iron Nitrate.....	6	8
Indigo, Auxiliary.....	12	15
Indigo, Bengal.....	1 45	1 85
Indigo, Caracas, fine.....	95	1 10
Indigo, Guatemala, fine.....	1 35	1 60
Indigo, Madras, fine.....	95	1 05
Indigo, Manila.....	85	95
Lac Dye, fine powdered.....	18	22
Lac Dye, good powdered.....	10	15
Lima Wood.....	31	41
Logwood, Campechy.....	11	11
Logwood, Honduras.....	2	2 1/2
Logwood, Laguna.....	2	2 1/2
Logwood, St. Domingo.....	11	14
Madder, Dutch.....	11	12 1/2
Madder, French.....	7	8 1/2
Maple Bark.....	2	2 1/2

Myrabolan.....	per lb. \$	5	6
Muriate Acid.....	11	14	24
Muriate Tin.....	19	22	24
Muriate Tin, strong.....	19	22	24
Muriate Tin, oxy.....	21	22	22
Muriate Tin, crystals.....	21	22	22
Nicewood.....	7	9	8
Nitrate Iron, P.O.S.....	11 1/2	12 1/2	12 1/2
Nitrate Lead.....	7	7	7
Nitric Acid, (Aqua Fortis).....	11 1/2	12 1/2	12 1/2
Sulphate, Aleppo.....	16	22	22
Orcelle Paste.....	10	11	11
Oxalic Acid.....	64	74	74
Pearl Ashes.....	20	20	20
Perlan Berries.....	48	50	50
Pieric Acid.....	5	5	5
Potashes.....	27	31	31
Prussiate Potash, yellow.....	65	70	70
Prussiate Potash, red.....	11	2	2
Quercitron.....	24	24	24
Red Wood.....	3	4	4
Red Sanders.....	18	20	20
Stannate of Soda.....	11	2	2
Starch, Corn.....	6	6	6
Starch, Potato.....	6	6	6
Starch, Wheat.....	6	6	6
Sulphate of Soda.....	24	40	40
Sulphate Extract.....	per lot. \$	7 00	8 00
Sul Annuaire.....	12	13	13
Sul Soda.....	11	12	12
Sapanwood, ground.....	21	2	2
Schinde Blue.....	90	101	11
Sugar Lead.....	22	24	24
Sunne, Sicily, according to grade.....	per ton.	85 00	90 00
Sunne, No. 1.....	55 00	60 00	60 00
Soda Ash.....	per lb. \$	2	2 1/2
Sulphuric Acid.....	11	24	24
Tartaric Acid.....	55	60	60
Terra Japonica.....	41	41	41
Turkey Blue.....	13	13	13
Uranianite.....	13	25	25
Vergilite.....	30	35	35
Vend.....	10	12	12

BUSINESS OPPORTUNITIES.

F. J. BIRD, AUTHOR OF THE DYEERS HAND BOOK, is prepared to furnish reliable recipes in any branch of Dyeing, and will have pleasure in matching to any color or shade for special customers, of his new Aniline Colors. See advertisement page 229.

Address, 212 N. Market Ave., Brooklyn, N. Y.

SUMAC.—The gathering of this most useful article commands special attention down South in parts where it abounds, especially in the State of Virginia. It is gathered in very large quantities by the negroes, who sell it to the merchants, or rather middlemen, who sell it again to the mills to be ground up. It is pulverized and sent on to the North, where it commands a ready sale at a remunerative price. The Virginia Sumac is now considered to be the best in the world, although until recently almost unknown. But its virtues soon caused it to be sought, and now it stands high in the market. There is a great deal of Sumac to be found on all the farms of this and neighboring States, and many an idle man, complaining of want of work, might make a decent living by collecting it. It costs nothing for the privilege of pulling it, for farmers in general are but too glad to be rid of it.

ACCORDING to a contemporary, water on freezing does not lose its impurities. Ice made from water purposely polluted with known quantities of organic matter retains about one-eighth.

(Continued from page 228.)

Recipe No. 142.

PINK ON COTTON.

50 lbs. Yarn.

Dissolve 5 lbs. Glaubersalt.

5 ozs. Erythrosine; B. S.

{ Meister, Lucius & Bruening,
Hoechts, A.-M.
Lutz & Movius, New York,
Boston, and Philada.

Enter yarn at 120° F., raise temperature to 140° F., and turn to shade.

It is advisable to use the required Aniline in two equal portions—one-half to begin with, and balance when finishing.

Recipe No. 143.

BLUE ON JUTE.

100 lbs. Yarn.

Dissolve 2 lbs. Alum,

1 lb. Tin Crystals,

10 ozs. Serge Blue.

Enter yarn and boil for 20 minutes.

Recipe No. 144.

GEN D'ARME BLUE ON JUTE.

100 lbs. Jute.

Dissolve 2 lbs. Alum,

1 lb. Tin Crystals,

8 ozs. Serge Blue,

3 ozs. Aniline Green.

Enter yarn and boil for 20 minutes.

Recipe No. 145.

VIOLET ON WOOL.

50 lbs. Yarn.

Dissolve 5 lbs. Glaubersalt,

7 ozs. Acid Violet, { Meister, Lucius & Bruening, Hoechts, A.-M.
Lutz & Movius, New York, Boston
and Philadelphia.

1 lb. Sulphuric Acid.

Enter yarn at 150° F., turn well, raise to boil and finish in three quarters of an hour.

Recipe No. 146.

GREEN ON WORSTED.

75 lbs. Yarn.

Dissolve 2 lbs. Alum,

1 lb. Tartar,

5 lbs. Glaubersalt,

3 ozs. Picric Acid, and

12 lbs. Indigo Extract.

Enter yarn at 190° F., give 3 turns, boil up. After one-half hour, raise and add 1 oz. Acid Green Aniline. Re-enter, give 5 turns, and done.

The Dye Woods and Chemicals used in this month's recipes are from Messrs. John M. Sharpless & Co., Philadelphia.

NOTES OF THE MONTH.

All communications under this head will meet with due attention, and coloring matters will be fairly tested.

MR. ROBERT ZOELLER, former representative in Philadelphia of Messrs. Bloede & Rathbone, has severed his connection with that firm, and now represents Messrs. E. Oakes & Co., who have removed their Philadelphia office to a more commodious location, No. 47 North Front St.

ZELLNER BROS. is the name of a new firm who have opened an office at 37 South Front St., in this city. They are importers and dealers in Anilines, Dye Stuffs, Chemicals, etc.

GEO. H. PAINE, formerly in the employ of Messrs. Banning, Bissell & Co., in this city, has launched out for himself, and has opened an office at 105 South Front St., for the brokerage of Drugs and Chemicals. The firm's name is Geo. H. Paine & Co. They contemplate also making a specialty of manufacturers' supplies, and are the agents of the H. L. Pierce Mfg. Co. Celebrated Travelers, we bespeak success for them.

MESSRS. WM. PICKHARDT & KUTTROFF.—Alizarine on Wool fills another want in the art of dyeing. They are positively fast colors to light, air, and fulling.

C. TIERS MYERS & Co., of Philadelphia, Castiline. This valuable adjunct in dyeing has the double advantage of economy in dye-stuffs and softening the raw stock to make spinning a pleasure and spooling a past-time. Dyers should use this article more extensively; they will find it to their advantage. We are informed that there are several inferior articles palmed off on the dyers as Castiline, but we advise dyers and manufacturers to deal direct with this firm.

F. BREDT & Co. have furnished us with samples of Induline; also Archil and Indigo Pastes for combinations in producing fast dark blues on woollens. The experimental samples of dyeing have proved a success, and ere long we will produce them in our dyeing department.

CHLOROZONE, for bleaching, is gaining daily more favor amongst bleachers and dyers, since they are convinced no injury is done to the fibre. The work is better executed, in shorter time, and with less labor, than with Chloride of Lime, and when the article comes into general use will be equally as cheap if not cheaper than the present system. Mr. E. Lefranc, the improver of Chlorozone, is now visiting Philadelphia to introduce the article more generally, and we hope dyers and manufacturers will give the same due consideration. Mr. Lefranc is also introducing the various Oxykali Soaps, which have achieved a great reputation amongst manufacturers and dyers, the different brands being for special purposes, as scourer for woollens, finisher for cotton, detergent and weighter of silk. The Allan Hay Co., who are manufacturers, make a specialty of these goods.

PUTEAUX BLUE BB, is another brand of Puteaux Blue we have just received from Alexander Barril, N. Y., which we will test at our earliest opportunity.

N. SPENCER THOMAS' (Elmira, N. Y.) celebrated concentrated dye-stuffs are continually increasing in demand. Inquiries and orders for them are coming in from all parts of Europe. These dyes are generally appreciated. His Jet Black No. 44 and Blue Black No. 55, as well as his improved Logwood and Cutch, are recognized as superior articles, and those who have used them speak well of their merits.

METHYLENE BLUE (Pat.), from 0 to 0000, we have received from Messrs. Wm. Pickhardt & Kuttroff, N. Y. We will produce some samples on flannels in our November number, with their practical recipes. Messrs. Wm. Pickhardt & Kuttroff is the only firm in this country selling these blues; all others are imitation and of inferior quality, and persons selling or using these goods are liable to prosecution. The Methylene Blues are used very extensively for dyeing cotton and wool, also for printing. They are fast.

HENRY A. GOULD, Boston, has received from the *Actien Gesellschaft*, Berlin, Germany, a pure Safranin. We will produce sample soon.

E. SEHLBACH & Co., N. Y., have informed us that their Imperial Scarlet will stand fulling and does not bleed in the white for blankets. We will test it and present the results to our readers.

FISCHER & KELLER, N. Y., are perfecting their new mordant called Elaidine. Amongst calico printers it is used now extensively.

We expected samples of the patented Artificial Indigo from Messrs. Pickhardt & Kuttroff, N. Y., ere this. Information has reached us from European sources that it is a great success and a perfect Indigo.

EXTRACT OF LOGWOOD, QUERCITRON AND FUSTIC, manufactured by the Boston Dye-woods and Chemicals Co., Boston, is meeting with great favor in Great Britain and Ireland. In this country their superior qualities are well known amongst dyers and manufacturers.

E. OAKES & Co., New York, make an excellent quality of Oxymuriate of Antimony.

MR. J. HOBSPALL, the representative in this city of Read, Holliday & Sons, products of Huddersfield, England, is introducing their Anilines amongst the dyers. This firm manufactures, amongst their many products, a good Ponceau, Safranin, Magenta, and Green, which seem to please the dyers. They are low in price and good in quality.

DRAPER & Co., Pawtucket, R. I.—English Fig Soap is used extensively for wool scouring. Wm. Dawson is the agent for the same in this city.

LEEDS MANUFACTURING Co., N. Y.—Aniline Mordant we have made several tests of, and find it an article of superior quality, possessing a large quantity of Tannic matter is exceedingly practical and economical for mixed goods. For light shades on cotton, it is a superior mordant; saving time, money, and producing brilliant shades. Dyers using this article will find it to their advantage, as this mordant is of standard quality and can be implicitly relied upon.

OUR TABLE.

THE PRACTICAL HANDBOOK OF PRINTING, BLEACHING, AND FINISHING FOR CALICO MANUFACTURE IN GENERAL. By Leopold Breglia, former Professor of Chemistry in the Head Polytechnic school of Reichenburg (Bohemia) Colorist in the factory of Messrs. Paraf, Daral, Thann (Alsace), Albert Reiss Liesing near Vienna, etc.

The work now before us is really the best practical manual of calico-printing which has been yet produced, and is unquestionably ahead of anything in that line which offers information of thorough interest to manufacturers. It is in both French and German text, and presents 100 calico patterns of great beauty. There are altogether 268 shades of color, with practical recipes exactly corresponding with them. The tables of illustration are 25 in number, and are of cardboard, presenting a very attractive appearance. Unlike some other books which lay claim to perfection, this, without any ostentation, possesses all of the desired attributes of excellence, and none can take it up for examination without unreservedly acknowledging this fact. The very great experience of Professor Breglia ought of itself prove adequate to the task he has undertaken, and the evidence of every practical man must be that he has fully sustained the name he had already acquired. The work is got up in superior style throughout, and does great credit to the publisher, Gustav Weigel, of Leipzig. It contains 300 pages of beautiful typography clearly printed on heavy hot-pressed paper, with ample margin for library binding.

The author tells us in his preface that he did not intend to write an explanation of chemical processes, but rather to point out exactly by what means such merchandise might be produced at a reasonable price, of beautiful exterior and of a lasting quality. That he has fully succeeded in carrying out these his intentions, his work bears ample testimony, and we hope that all concerned in its contents will secure it, as a valuable aid and book of reference. The price, which for such a book is reasonable, is \$11.00, delivered in the United States. Any orders forwarded to us will be promptly attended to.

QUERIES AND REPLIES.

Under this head we invite all our friends to make their inquiries on every subject connected with dyeing, etc., and we will endeavor to give them such information in answer as they are in need of. We also invite others to give us aid of their experience in such replies. All will be welcome.

QUERIES.

85.—I want a good paste for resisting fast buff. Can you advise me? A. M.

86.—Is there any difference between Orchil and Archil?

ENQUIRER.

87.—How can the stain of iron be taken out of silk? N. T.

88.—Is there any prospect of a School of Dyeing here in Philadelphia? Is there one anywhere? C.

89.—In your last issue the sample of cotton bleached by Chlorozone has the formula of one gallon of Chlorozone to twenty gallons of water. Is not the bath too strong, and is it not likewise too expensive? The circular of the manufacturer directs the use of considerably less. I should like to be enlightened on this point, as I feel interested in Chlorozone. B. C.

ANSWERS.

85.—Mix 3 quarts Citrate of Soda (made thick with Kaolin) and 3 quarts of Gum Water.

86.—No, they are identical. Some persons choose A and some O as the first letter.

87.—It cannot be done.

88.—We have repeatedly pointed out the necessity for such an institution, but as yet we see no movement in the matter. There are such schools in Germany, France, England, and, we believe, Russia.

89.—The Chlorozone bath at one gallon of Chlorozone for 20 of water was intended to test the non-deteriorating virtue of this bleaching agent, and also the rapidity of its action on the cotton. As the bath can be used over (according to its strength), there is no extra expense attached to this excess.

CORRESPONDENCE.

In this department of the TEXTILE COLORIST we propose to publish all letters pertaining to the business of dyeing, bleaching, etc. But we wish to be distinctly understood that we will not hold ourselves responsible for any opinions set forth by writers.

A CORRECTOR CORRECTED.—In the recent issue (October) of our excellent contemporary *The Chemical Review*, we find, under the "Correspondence" head, the following:

"Sir:—I see in your Answers to Correspondents that 'One Puzzled' wants to know what Tamarack is. It is a bastard name used by London dyers for Turmeric, and I am sorry to say Lancashire dyers fall into the error after being in London a short time. I see a drug very often used in the American TEXTILE COLORIST—Sal Soda. Can you tell me what it is? I am, Sir,

"ANOTHER ONE PUZZLED."

Here is another case of the blind leading the blind. We shall try to enlighten the leader, however. Turmeric and Tamarack are two articles as distinct as any two things can well be, which will be evident on consideration of their relative characters, which we here give: Turmeric is the root of a plant (*curcuma longa*), a native of India, China and Madagascar, largely cultivated in Bengal. It dyes full shades unaided by a mordant, but is very fugitive, being alike affected by acids and alkalis. Tamarack is a tree which grows extensively in the swamps of the Northern States, which from that fact obtains the name of "Tamarack Swamps." It is, in

fact, the larch (*larix Americana*), possessing thread-like deciduous leaves, which grow in bunches. The Tamarack extract is extensively used in dyeing, but its qualities were unknown, save as a useful timber, until within a very few years.

(Expressly translated from the *Färber Zeitung*, for the TEXTILE COLORIST.)

The Application of the Azo Dyes, Orange, Ponceau, Bordeaux, etc.

BY DR. E. ALBRICH.

The ordinary cotton yarns, also jute, are dyed by merely dipping them in Basic Sulphate of Alumina, of about 15° B. For this purpose a concentrated solution of Sulphate of Alumina is prepared, which is mixed hot with a concentrated solution of crystallized Soda (about one half of the weight of the Sulphate of Alumina), until a lasting precipitate is produced, from which it is filtered off. The cotton is left in this mordant from five to six hours, wringing and finish dyeing in one bath, which contains about 10 k. dye-stuff for 100 k. cotton, and can likewise be used over again. In this case, also, merely 1 to 2 per cent. dye, of the weight of the cotton, is actually used, according to the shade which it is to be attained.

For the various baths as little water as possible is used. For dyeing of loose cotton the following is the method:

It is placed in a clear bath of 10° B. strength of Stannate of Soda, in which it is left for three to four hours. Thereupon the cotton is placed in baskets and well shaken out.

To the dyer's bath, which is of about 60° C., 10 k. dye-stuff and 10 K alum is added. Finish dyeing by handling the cotton for several hours in an equal temperature.

The printing of cotton caused hitherto some difficulties, since it would not produce colors which could withstand washing. By the following treatment it is now possible to produce water-fast, if not soap-fast, colors, which are distinguished on account of their great beauty and brightness. The treatment is as follows:

100 gr. dye-stuffs are dissolved in 500 gr. boiling water. Thereupon a solution of Alumina of Soda or Stannate of Soda of 15° B. is prepared: one liter to 20 grs. Turkey-red oil, which must be well stirred in. Of this solution take 150 grs. and add the same to the solution of dye. On this mixture the printing-dye is attained by the adding of thickening matter. The best substance to use is starch.

After the printing is done, let dry, steaming as usual, placing the article in a bath of 5° to 10° B. of Acetate of Lead, or Acetate of Baryum; in lieu of which, Chlorure of Baryum may also be used.

By this treatment it is presumed that the printed stuff had been prepared with Turkish-red oil, as is generally customary now. If the stuff, as is the case in the fabrication of shawls, are prepared with Stannate of Soda and Cassine, the fixation of the dyes will cause no difficulties at all.

The dyeing of paper is performed thus: Of the dyers' solution, about 1 per cent. of the dry paper-mass is placed in the stuffing-engine and then precipitated in the solution of a metallic oxyd. It

is best to apply litharges; but if these are to be avoided, Chlorure of Baryum should be used.

A livelier color, which also distinguishes itself by a greater intensity, is obtained by adding to the dyers' solution some Alumina of Soda, i. e. about half of the weight of the dye-stuff, and then precipitating in the described manner. The salt serving as a means for precipitating must be added so long until a filtered sample runs off colorless.

The fabrication of lake dyes is performed in a very similar manner by mixing the dyes with solutions of Alumina of Soda or Stannate of Soda, and by filling with the above mentioned salts. If instead of Alumina of Soda a solution of Phosphate of Alumina in Soda is applied, the cost of the lac-dyes is essentially enhanced.

The dyeing of leather is performed in the usual manner by the application of but little Sulphuric Acid, which is added to the 30° to 40° C. warm dyes' bath, or by passing the skins after stamping the same, through a strongly acidified water, and finishing the dyeing in a neutral bath. The skins may be also dipped in Basic Sulphate of Alumina, and then finish dyeing. If dye-stuff is to be economized, it is to be recommended to join the skins before dyeing, and to sew the edges up, in order to prevent the dye coming in contact with the backs. The brushing up of a concentrated acidified solution can be recommended also for this purpose; but the skins must in this case be washed after dyeing.

Influence of the Chemical Composition of Water in the Preparation of Crude Silk.

Authorities are decided that the chemical composition of water used in the preparation of crude silk exercises a considerable influence on the nature of the product obtained. In effect, by the winding of the cocoons, working them in warm water, the soluble gum of the fabric is plastered on in the solution. Following out this experience of the authorities, the cocoons were repeatedly subjected to hot water treatment, with a loss of 22 to 26 pounds per cent.

But this loss of soluble matters prejudices the quality of the silks; for they are precisely the matters which give to the silk appearance, color and tenacity. Authorities have observed that the loss in the tenacity of the silk is exactly proportional to the loss of soluble matters. But, this last varies with the chemical composition of the water employed. Having analyzed a great number of waters used by the spinners who make products of superior quality, authorities have noticed that: 1st. The hardness of those waters varies between 4° and 20°. 2d. The proportions of dissolved mineral matters are shown as follows:

Carbonate of Lime,	0.0206	to 0.1339 grammes.
Sulphate of "	0.0000	" 0.0506 "
Chlorides of Potassium and of Sodium,	0.0000	" 0.1000 "
Carbonic Acid,	0.0010	" 0.0125 litre.

3d. The winding silks in soft water have less appearance, color, and solidity than those prepared in hard water. Hard waters, in fact, dissolve less of the soluble matters adhering to the fibre, and in consequence furnish a silk of better quality. In order to prove that the solubility of the substance is in inverse ratio to the hardness of the water employed, those authorities quoted caused to be

dissolved equal quantities of isinglass (which, chemically, is analogous to the gummy matter of the silk) in equal volumes of water of a hardness 0 to 20°, the distilled water possessing the greatest dissolving power remaining limpid, whilst that which is hard, represented by 29°, held the gelatin in suspension, besides having the greatest difficulty of all.

We see, then, that the hard waters are most appropriate to the silk industry. These same authorities propose (and that, too, successfully) to correct the water for the spinners, giving the desirable degree of hardness to the mineral matters, the proposed additions consisting in precipitated sulphate of magnesium (in crystals), and carbonate of sodium (in crystals). Many spinners of Lombardy tried these corrections of water according to the furnished method in equivalent products, with those of the spinners working with artificial water, without obtaining as good results in winter as in summer for the same addition of mineral matters.—[*Deutsche Chemische Gesellschaft*.]

Beware of the Greeks!

THERE are few things which cause more wide-spread elation than the confident feeling of national prosperity. With a liberal harvest, a profitable commerce, and a rapidly declining debt, what nation would not rejoice? Now all these causes of happiness are ours to-day, and yet we differ amongst ourselves as to the question of maintaining them. Wild visionary schemes of increasing our wealth by entering into open competition with the world at large possess the minds of far too many of our countrymen, who are doubtless quite honest in their motives. But, are they as sensible as they are sincere? We most decidedly think not. There are narrow-minded people in the world whose views are more to be depended on than those of an ultra liberal cast, and these latter are difficult to bring under practical control. They will run wild in their ideal course and be obstinately blind to the real interest of the country, be that interest never so palpable. The class we allude to is what is called the "Free Trade Party," whose patriotism consists in a loud assertion of world-wide liberality at the expense of their country's welfare. Of course this party is warmly supported by foreign admirers, whose interest it is to succeed through such means in deluging this country with cheap handicraft, in payment for our surplus crops, which they stand sorely in need of. It is all very well, and moreover judicious of those of free trade propensities to deny that, if trusted, their aim will be to carry out their old-time, well-understood sentiments; but, such a change of base draws down suspicion as to its integrity, and caution prompts the cry throughout the land, *Timeo Danos!* (Beware of the Greeks.)

ABOUT 60 per cent. of the tartaric acid made in Germany is imported into England, though Germany obtains raw materials for this manufacture almost entirely from abroad.—*Chemical Review*.

Advantages of Vanadium.

This valuable metal being now fully adopted in the coloring industries of Europe, deserves a review of its merits. Undoubtedly, our American dyers and printers have been or will be called upon by the progress of improvement to examine these merits practically. It is, therefore, timely and useful to give them all possible information on the subject, which we have already treated in preceding numbers of the TEXTILE COLORIST.

The discovery of Vanadium by the Swedish metallurgist, Sefstraem, and the subsequent improvements by Berzelius, of that remarkable metal are too well known to dwell upon. The extraordinary energy of vanadium could only be appreciated from the time of its accessible price; up to which it was so scarce and so high that regular industry could not approach it. Hence, the long period of the apparent indifference, or ignorance of the trade in regard to its industrial value.

But as soon as it was discovered that black dyeing, printing, and ink, could be so perfectly made by its subtle atomic diffusions an increasing demand developed its production which being organized industrially brought the price down. Still there is margin for new applications of that metal which is yet known but to a comparatively small number of readers and searchers.

The intense properties of that metal can be appreciated from the fact that less than the one thousandth part of it is required to oxidize perfectly the dyeing of 1 kilo of aniline salt in black. Its action with the chlorhydrate of aniline determines a complete oxidization of the dyed goods in two or three days of exposure in the oxidizing room, with a heat of 25° centigrade, and 20° of dampness.

The long and vexed question of a positive oxidizing securing black aniline dyes against greening seems to be almost settled by the practical advent of the vanadic ingredients. Another notable point in favor of this metal is that its application has proved to be cheaper than that of sulphate of copper which is a far inferior oxidizer for aniline blacks.

The comparative process herewith made will demonstrate the difference between the two. It must be observed that the preparation of the paste is the same for either of the oxidizing rivals. Sulphate of copper and vanadate of ammonia, which is the form in which vanadium enters into the printing black. The composition of the paste is made as follows:

Water.....	5 litres.
White Starch.....	1 kilo.
Roasted Starch.....	1 kilo.
Chlohydrate of Ammonia.....	1 kilo.
Chlorate of Potash.....	" "
Sulphate of Copper.....	" "
Muriatic Acid.....	900 gramm 21 B.

It is in place of sulphate of copper that vanadium enters into the composition, only for 5 centigramms in weight and at

considerable less cost than sulphate of copper. The vanadium metal being insoluble in salts, it is not used in its state of vanadate of ammonia. It must be reduced in solution as follows before using it with the above compounds:

Add 10 grammes of vanadate of ammonia to 40 grammes of muriatic acid somewhat diluted. Heat the liquid slightly in a chinaware vessel and add by small doses some glycerine, and raise to boiling until the liquid has turned from blue to a deep green and that all the particles are well dissolved. This concentrated liquor can be diluted in ten litres of water to be kept and used accordingly. Supposing it has to be used on ten kilos of aniline salt in the dye, one litre will just give the one gramme of vanadium required for oxidizing the bath. The glycerine is used here as a reducer preventing the effervescing of the chloride of vanadium generated by the muriatic acid.

The paste of aniline blacks vanadized is favorable to all printing and bears perfectly steaming after oxidization. So it is equally with red alizarine the mordant of which is not effected by vanadium. For the same reason the metallic rollers of the printing machine are not affected by vanadium, being promptly oxidized by air and reduced almost to soluble matter, it has no influence on steel or other metals. The use of vanadium has led to the discovery of a new aniline oil producing ungreennable black. This oil is spoken of in the European press as being very effective and superior to any known. But, we have no positive data yet to furnish on this point. Limiting our report to the attested facts in favor of vanadium, we merely announce the probable arrival of the new comet among our common American coloring industries. E. L.

A Review of Improvements in the Manufacture of Colors.

The almost immeasurable series of coloring matters increases daily, and a number of the most eminent chemists are engaged in this department. Theory will soon in this industry be the ruler of practice. The azo-coloring matters are being thoroughly established. A manufactory has been opened at Uerdingen, on the Rhine, which is almost exclusively engaged with this class of colors. It is only to be lamented that a considerable reduction of prices has taken place. The impulse which the discovery of the resorcin and the azo-colors has given to the art of dyeing is very significant. In silk-dyeing the natural colors are almost exclusively set aside. Safflower, which had already in many of its applications been superseded by saffranine, is now completely abandoned in favor of eosine and its ethers (primerose), and of the iodized resorcin colors (Erythrosine, Rose Bengale, &c.). Formerly almost all made colors were produced by combinations of orchil, extract of indigo, and turmeric, but now the tropaeolines, indulines, rocelline and malachite greens are employed for these purposes.

A pure yellow dye which will work on in an acid beck, and which is capable of being substituted for turmeric in all cases is still a desideratum.

In woolen-dyeing the aforesaid artificial colors have done great damage to archil and indigo. The first attack upon cochineal in wool-dyeing was made by the brominitro-fluoresceines; upon these followed the scarlets of Meister, Lucius & Breuning, which have almost entirely superseded cochineal, but which are in their turn threatened by the competition of the "Biebrich scarlets."

In cotton-dyeing the resorcin colors are but little employed, and the acid azo-colors not at all, as the proper mordants have not yet been discovered. The basic azo-colors, Bismark brown, and especially chrysoidine, however, are doing good service. The last mentioned dye will probably prove fatal to phosphine (chrysotoluidine).

In calico printing coeruleine and methylene blue have found very extended applications. The latter seems likely entirely to supersede alizarine blue, the consumption of which has never been extensive.

The sulphocyanides have latterly been used with satisfactory results as reserves for aniline blacks.

As regards the artificial production of indigo on the large scale, there are still various difficulties to be encountered. The method patented by Professor Baeyer does not, in the first place, admit of a complete conversion of the toluid into indigo. All his methods of procedure take their point of departure from ortho-nitrocinamic acid, which is produced only to a very small extent along with the para-compound on the nitration of cinnaemic acid. For the practical solution of this question, a process must be found in order to introduce at will new groups into the ortho-position. Such a case is as yet only known for orthophenol sulphuric acid, but this also, when heated, passes into the isomeric para-compound.

The so-called indigo substitutes increase from day to day.

—*Chemiker Zeitung.*

Analysis of Soaps.

For the determination of moisture, Jul. Lowe, according to the *Zeitschrift für Analytische Chemie*, takes from 8 to 10 grms. shaved very finely, and dries them first, at 60° to 70°; afterwards at 100° to 105°. If it is supposed that the soap contains caustic alkali, the process must be conducted in an atmosphere free from carbonic acid. The free alkali may also be determined before the process of drying by exposing a portion of soap, shaved very fine and weighed, upon a watch-glass in a cylinder filled with dry carbonic acid and closed, the proportion of caustic alkali being calculated from the increase of weight. The exposure must not last too long, in order to prevent the formation of bicarbonate.

To determine free unsaponified fat, the portion of dried soap is thrown into a rather high beaker, capable of being well covered, and extracted with benzol or petroleum with the aid of heat, according to the method of Perutz, and decanting when clear into a small tarred flask. If the decantation is difficult it is passed through a weighed filter, which is afterwards used for the alcoholic solution of the soap. After two or three extractions the filters are collected and distilled, the residue dried at 108° in a chloride of sodium bath, and the increase of weight of the flask noted, which shows the proportion of the non-saponified fat.

The residue freed from such fat is covered with about eight to ten parts of alcohol at 90 per cent., and heated to 40° to 50° in the water-bath. Caustic alkali, and that in combination with fatty acid, along with glycerine, are readily dissolved, while soda (carbonate), farina, and mineral impurities remain undissolved, and after washing with hot alcohol, and drying at 100° may be weighed. In the better class of soaps the residue does not exceed 1 to 1½ per cent.

A moderate stream of well washed carbonic acid is then allowed to play upon the surface of the warm alcoholic filtrate. Caustic alkali, if present, is deposited as alkaline carbonate. The beaker is covered, allowed to stand till clear, heated in the water-bath, the contents filtered, and the filter is washed with warm alcohol. In the aqueous solution of the residue the carbonate of soda may be determined volumetrically.

The second alcoholic filtrate, thus freed from soda, is mixed with alcohol as long as turbidity is produced. When clear, the sulphate of soda deposited is filtered off, collected upon a weighed filter, washed with alcohol, dried at 110°, and weighed. The weight shows the alkali which was in combination with the fatty acids.

The filtrate is acidulated with sulphuric acid, mixed with water, and freed from alcohol by evaporation in a platinum capsule. When cold, the acid aqueous extract which may contain glycerine, is separated from the congealed fatty acids by filtration. These acids, as well as the glycerine, may be determined by known processes, the latter after the accompanying sulphuric acid has been saturated with barium carbonate.

The residue, insoluble in alcohol after being weighed, is washed with cold water till the filter makes up exactly 60 c.c. The water is then driven out of the filter by means of alcohol, and the residue is dried at 100°.

After being weighed, the residue is submitted to microscopic examination, in order to detect starch. Mineral impurities are sought for by ordinary analytical methods.

METHOD FOR BLEACHING COTTON YARN (1,000 lbs.).—A con temporary gives the following:—1. Begin by putting in a bath 3 lbs. of soda, 3 lbs. of milk of lime, and the necessary quantity of chloride of lime (bleaching powder)—about 12 lbs., according to the quality of the yarn. Let the yarn lie in this bath for from ten to twelve hours, at a temperature of about 78° F. 2. Wash, and put in fresh bath of weak sulphuric acid, at 1½° Be, for one hour, and then wash well. When in the chlorine and also in the acid bath it is stated to be advisable to keep the liquor in movement by pumping it with a leaden pump, making it flow through the cotton again and again. [Improved Chloroxone would be preferable to this method.—*Ed.*]

The Garment-Dyer's Memoranda on the Removal of Stains and Spots.

Matter adhering Mechanically.—Beating, brushing, and currents of water either on the upper or under side.

Gum, Sugar, Jelly, etc.—Simple washing with water at a hand heat.

Grease.—White goods, wash with soap or alkaline lyes. Colored cottons, wash with lukewarm soap-lyes. Colored woollens

the same, or ammonia. Silks, absorb with French chalk or fuller's earth and dissolve away with benzine or ether.

Oil Colors, Varnish, and Resins.—On white or colored linens, cottons or woollens, use rectified oil of turpentine, alcohol, lye, and their soap, very cautiously.

Steriline.—In all cases, strong pure alcohol.

Vegetable Colors, Fruit, Red Wine, and Red Ink.—On white goods, sulphur fumes or chlorine water. Colored cottons and woollens, wash with lukewarm soap-lye or ammonia. Silk the same, but more cautiously.

Alizarine Inks.—White goods, tartaric acid, the more concentrated the elder are the spots. On colored cottons and woollens, and on silks, dilute tartaric acid is applied, cautiously.

Blood and Albumenoid Matters.—Steeping in lukewarm water. If pejsine, or the juice of *Carica papaya*, can be procured, the spots are first softened with lukewarm water, and then either of these substances is applied.

Iron Spots and Black Ink.—White goods, hot oxalic acid, dilute muriatic acid, with little fragments of tin. On fast-dyed cottons and woollens, citric acid is cautiously and repeatedly applied. Silks, impossible.

Lime and Alkalies.—White goods, simple washing. Colored cottons, woollens, and silks are moistened, and very dilute citric acid is applied with the finger end.

Acids, Vinegar, Sour Wine, Must, Sour Fruit.—White goods, simple washing, followed up by chlorine water if a fruit color accompanies the acid. Colored cottons, woollens, and silks are very carefully moistened with dilute ammonia, with the finger end. [In case of delicate colors, it will be found preferable to make some prepared chalk into a thin paste, with water, and apply it to the spots.]

Tanning from Chestnuts, Green Walnuts, etc., or Lumber.—White goods, hot chlorine water and concentrated tartaric acid. Colored cottons, woollens, and silks, apply dilute chlorine water cautiously to the spot, washing it away and reapplying it several times.—*Muster Zeitung für Faerberei, Druckerei.*

Soap and Its Influence in Dyeing.

Soap, like many other chemical products, must be made adaptable to its special applications either on cotton, wool or silk. It is erroneous to believe that a soap made for the common domestic uses is also good for industrial purposes, such as fulling, deterging, drying, finishing, &c. The excess of alkali, rosin, and fatty matters, more or less amalgamated in the ordinary washing soap, may be without great consequence on the household goods, while it may create considerable disturbance in the dyeing and finishing applications. Many times, dull shades, imperfect colors, cloudy spots, streaky lines and poor cast have no other causes but the traces of insoluble soap incorporated in the goods. Generally, soaps made without due proportions, or with inferior grades of the constituent parts, are not only expensive because of the waste, but also very injurious through the defects they cause in dyeing.

Any excess of alkali, or of fatty matter, has always some in-

fluence over certain colors, especially those of delicate shades.

The principal conditions of a good soap made expressly for dyers rests on a perfect amalgamation, and on a proper proportion of the constituents. The characteristics of such a soap are: a fine grain, a dry and solid body, a neutral taste, and a ready solubility or incorporation in water. The bath made by this soap is milky, deterging and softening. It has a peculiar solvent power which removes the foreign matters from the fibre without affecting it by causticity. Whiteness, suppleness and purity are the principal requirements of any fibre, vegetable or animal, to receive a good color; any fabrics not so prepared are liable to be refractory, more or less, immediately to the action of the coloring matter.

The sizing and finishing of certain sorts of goods also demand certain qualities in the soap, notably when substituted for tallow in the starch. This class of soaps must be made with an intimate knowledge of the wants and requirements of the dyer and finisher.

The new soaps called Oxykali seem to economically unite all these requirements of the profession. They are manufactured with special ingredients, critically studied for the respective natures of silk, wool and cotton. They give to the fibre the purity and suppleness necessary to receive the various applications subsequent to deterging, suppling, &c.

Made from the latest formulas of Europe, especially of Lyons, where all these questions are scientifically sifted, these Oxykali Soaps have the peculiar properties of imparting to the fibre some appropriate value, especially to the silk, which they deterge and prepare to the nicest point for dyeing and loading at will. Such advantages cannot fail to draw the earnest attentions of the interested dyers and traders to this precious staple.

Dyeing Unspan Cotton.

Black (220 lbs.).

Dissolve 33 lbs. extract of logwood, boil the cotton in it for an hour, lift, drain, and leave spread out for some hours.

Make up a new water at 100° Fahr., with

Chromate of potash..... 4 lbs. 6 ozs.

Bluestone..... 4 lbs. 6 ozs.

Work the cotton for an hour, take out and rinse. This operation gives a blueish-black.

For a browner shade, add to the logwood beck, when cooled down to 122° Fahr., 6 lbs. 9 ozs. soda ash; work the cotton in it for half an hour, take out, add further 2 lbs. 3 ozs. copperas; re-enter the cotton and work for another half hour.

Grey (220 lbs.).

Make a decoction of

Extract of logwood..... 8½ lbs.

Sumac..... 44 lbs.

Enter the cotton and boil for half an hour, stirring. Lift, drain, and pass into a cold water containing 17½ lbs. copperas. For brighter greys take the cotton finally through a lukewarm water, to which the solution of a little aniline violet has been added.

Fast Black for Fulling (220 lbs.).

Enter in a water with

Dry extract of logwood..... 22 lbs.

Dry extract of bark..... 3 lbs. 13 ozs.

Boil for an hour and a half, lift, and wring, and enter in a cold water with

Bichromate of potash..... 2 lbs. 3 ozs.
Bluestone..... 1 lb. 10 ozs.

Five turns, lift, and wring.

Make up a new bath, and add 5 lbs. 7 ozs. soda ash; give five turns at a hand heat, lift, and add 2 lbs. 3 ozs. copperas; five more turns, lift, wring, and dry.

Nautin (220 lbs.).

Dissolve in hot water

Alum..... 11 lbs.
Catechu..... 33 lbs.
Bluestone .. 51 lbs.

Add the solution of 54 ozs. tropeline.

Work the cotton for half an hour at 140 F., lift, rinse, and dry.

Fast Catechu (22 lbs.).

Dissolve in a boiling water

Yellow catechu 31 lbs.
Brown catechu..... 1 lb. 1 oz.
Bluestone..... 41 ozs.
Extract of Fustic..... 1 lb. 1 oz.

Enter, steep two hours, wring, and enter in a boiling water containing 84 ozs. chromate of potash. Six turns, wring, and one more turn in each beck.

Dissolve then in the catechu 17 ozs. of alum and re-enter; six turns, lift, add the decoction of 17 ozs. sapan wood, boil for half an hour, wring and dry.

Raise in a weak beck of aniline brown.

Special Blue on Cotton (22 lbs.).

Dissolve in three vessels separately 7 ozs. tartar emetic, 2 lbs. 3 ozs. sulphate of alumina, 104 ozs. soda ash.

Mix the three solutions, and then add 1 oz. yellow prussiate, also dissolved separately. These four solutions form mordant No. 1.

For mordant No. 2 dissolve 84 ozs. tartaric acid in boiling water.

Make up a water at 167° Fahr., and add the mordant No. 1 with 14 oz. to 24 ozs. "special cotton blue" previously dissolved in boiling water.

Enter the cotton and work for quarter of an hour.

Lift, add from 1 oz. to 1 oz. more of the blue, according to shade. Lift, add mordant No. 2, and work for half an hour. Wring without rinsing and dry. For deep shades the tartar emetic is not required.—[*Teinturier Pratique*.]

[Expressly Translated from Foreign Sources.]

Solid Dyeing of Raw Wool.

LEAD GRAYS.

(100 kilos of washed wool.)

Boil for an hour in a bath containing:

10 kilos of Logwood.
2 kilos of Sumac,
500 grammes of Turmeric,
2 kilos of Tartar,
500 grammes of Alum.

Then sprinkle the wool; turning it round continually, with the solution of 1 kilo of Sulphate of Iron.

Next, boil for half an hour.

SOLID MAROON ON EITHER RAW OR SPUN WOOL.

(For 10 kilos of wool.)

Put in a sack

8 kilos of Fustic,
2½ kilos of Logwood,
1 kilo of Orchil,
to make a decoction. Then add the decoction of:
7 kilos of Camwood,
10 kilos of Madder,
6 kilos of Sumac,
2 kilos of Tartar.

Enter wool for one hour at the boiling point, and then add:

1 kilo of Sulphate of Copper.
Boil for half an hour, and sadden with
1 kilo of Sulphate of Iron.

Finally, finish with

1 kilo of Ammonia,

and done.

BLACK ON FLANNEL.

Some flannels are often manufactured in black and red, with some white, and black wool, being dyed afterwards to a poppy color, whereas some vat-blue and white were ordinarily used. Those two colors, when woven and dyed in poppy color, the first dyed black and the white dyed red. A black, so as to be useful for the first method, must naturally resist the poppy-colored bath. This black is quite different from the ordinary black, which is as follows:

(For 10 kilos of wool.)

The bath is to be made in the following manner:

16 kilos of Logwood,
5 kilos of Fustic,
2 kilos of Tartar,
1 kilo of Alnm.

Boil for one hour, and sadden with the solution of

2 kilos of Sulphate of Iron,
1 kilo of Sulphate of Copper.

Boil for half an hour.

The dyeing in poppy-color must be made slowly, and not allowed to stay over 25 minutes in the cochineal bath. A bichromate black could not be used in this case, because the Tin Salt and Oxalic Acid will turn it to violet and brown.

ASHES ON RAW OR SPUN WOOL.

(For 15 kilos of wool.)

Boil during an hour and a half in a bath containing:

1 kilo 250 grammes of Bichromate of Potash,
1 kilo 500 grammes of Sulphuric Acid.

Let it get cold in the bath; then take off and dye in a fresh bath, composed as follows:

3 kilos of Logwood,
1 kilo of Sumac,
500 grammes of Carmelite.

Boil for an hour and deepen in same bath with
1 kilo of Sulphate of Iron,
1 kilo of Tartar.

GOLDEN MAROON.
(For 150 kilos of wool.)

The mordant will be made during 14 hour with
3 kilos of Bichromate of Potash,
1 kilo 500 grammes of Sulphuric Acid,
3 kilos of Alum,
500 grammes of Oxalic Acid.

The dyeing is performed in a fresh bath, with the decoction of
30 kilos of Fustic,
2 kilos of Logwood,
2 kilos of Carmelaine,
6 kilos of Archil.

Cool off. Return to mordant. Then boil one hour; deepen
in same bath with 2 kilos of Sulphate of Iron and 800 grammes
of Sulphate of Copper. Then turn for half an hour and rinse.

TEA SHADE.
(For 25 kilos.)

The mordant is done during one hour at the boiling point,
with

500 grammes of Bichromate of Potash,
1 kilo of Tartar,

and left to cool in the bath; then dyed in a fresh bath for one hour,
with

1 kilo of Fustic,
250 gr. of Carmelaine, and
A little Indigo Carmine.

DEAD LEAF SHADE.
(For 25 kilos.)

The mordant is made as above, and the dyeing with

3 kilos Cutch,
2 kilos Fustic,
1 kilo Logwood.

NAVY BLUE.
(For 150 kilos.)

The mordanting is done during 14 hour at boiling point, with
2 kilos of Bichromate of Potash,
3 kilos of Sulphuric Acid,
4 kilos 500 grammes of Tartar.

Then left to cool in the bath, and the dyeing done during
one hour at the boiling point, with

25 kilos of Logwood,
2 kilos of Sulphate of Indigo.

We give the foregoing recipes for what they are worth.—Ed.

~~Now~~ We will pay SEVENTY-FIVE cents a copy for our first
number, January, 1879.

(Translated expressly for the TEXTILE COLORIST.)

The Means of Finishing Textiles.

BY DR. H. GROTHE, PUB. D. A. POLYTECHNISCHE ZEITUNG.
(Continued from page 203.)

Section II mentions in first line Glucose as a means for finishing. Glucose, however, is used for finishing purposes directly in very limited quantity, because it becomes very easily decomposed, and then produces a strong mould formation.

Of much greater importance is Glycerine.¹ This article offers, for the purpose of finishing, very valuable properties. It is cheap, draws moisture from the air, besides it makes the finishing mass and textures smooth, and increases their weight. Unfortunately, however, Glycerine is frequently adulterated, and when the means of adulteration is Glucose, the good qualities of the Glycerine are thereby made void.

Dulcine is a mixture of Glycerine, Gum and China Wax. This article is known in commerce by that name.

Starch-gum is produced by the roasting of Starch Flour, by the influence of Acids, or by aid of the Diastase.² M. Laditte proposed finishing masses of Dextrin, and it was readily applied in England (British Gum) by mixing it with other means, as starch, flour, etc. By itself, Dextrin cannot act as a means for finishing. It causes the threads to become hard and stiff, and besides this is very soluble in water, and gives the goods a dirty appearance. It is, however, to be noted that the formation of fungi rarely affects the finishing masses which contain Dextrin, even if the conditions are otherwise favorable. This Starch Gum is known in commerce by various appellations. The darker sorts are termed: Leicomme, Leicogomme, Amidon-grille, Amidon-brule, Torrid Gum, Roasted Gum; while the lighter sorts are called Gommeline, Dextrin, Gommein, Lefevre-gum, etc. White Dextrin is Dextrin prepared with Nitric Acid, which only becomes a real Dextrin by increasing the temperature. Furthermore, another kind is known as Crystal Dextrin, i. e. the translucent curled Dextrin solution. Lucin is a Dextrin, which is produced from the glutinous elutriation masses while making starch.

Decoctions of moss and sea-weeds (algous) serve as excellent means for finishing. Iceland (Irish) moss are sea-weeds (algous), Choudrus species. Ceylon moss, Carragheen moss (Sphacrococcus), is very productive and applicable. The decoctions appear as slimy, gelatinous masses of great adhesive power; they frequently serving as admixtures for loading and filling. The decoction is best made thus: by soaking 3 kilos of the mass in 30 kilos water, and then adding some crystallized soda, and then allow it to settle. The slime may then be taken off, and this treatment may be repeated twice or three times. To this class belong likewise the Hai-Thao, Lay-Cho and Agar-Agar (of Gelidium).

The gum species, especially Gum-Arabie, Gum-Tragacanth, Shellac, etc., form very essential means for finishing. Applied in a common aqueous decoction they show a great affinity for adhesion to the admixtures, but in a dry state they cause the textures respecting the finishing masses to become hard and stiff.

1. The present condition of the glycerine industry is described by Kraut, vide Report concerning the development of chemical industry, II, p. 296. Mospratt, Chem. III, Ed. Glycerine.

2. L. Von Wagner, Starkefabrikation, p. 266. Mospratt, Chem. III, Ed. Dextrin.

Rosins, also, are much employed, especially Colophony, Gallipoli-rosin, etc. They are for purposes of finishing decomposed by Crystal Soda, and with this combined in rosin-soaps. For 1 kilo of light Colophony, use, for instance, $\frac{1}{2}$ kilo Crystallized Soda and about 5 kilos water. This rosin-soap has a great binding power, and hence holds the filling substances well together. For the mechanical treatment of smoothing and pressing, the addition of this appliance furnishes valuable advantages for the finishing mass.

The application of Gline (and offalls of skin, etc.) for finishing purposes, should be always avoided, since the fungi formation is directly caused and essentially enhanced thereby. Especially exceptionable in this respect is the customary addition of putrid urine. Ammonia, putrid matter and phosphates aid greatly in the formation of mould in finishing pastes, composed of flour and starch substances.

In this category belong also the entire series of glue species, gelatines of various fish-parts, isinglass, etc.

Of very great importance are soaps in mixture with fermented flour. The alkali of the soap binds quickly all acids which may have remained therein, as also the fats. But if the finishing appliance should contain alkaline clays, no soap must be used, since it would form, with those, indissoluble soap.

An essential part: Take the fats and oils heretofore named, such as animal tallow, bone-marrow, yolk and other substances. They are intended to keep smooth and flexible the flour and starch masses which are applied in larger quantities, but they are favorable to the fungi formation. Of the vegetable fats and oils, the following are especially used: Coconut Oil, Sheabutter (Bassia, Butyrospermum), Palm Oil (Palmiton), Castor Oil (Vicinus), Olive Oil, and other oils, such as Cotton-seed Oil, Rape-seed Oil, Poppy-seed Oil. These fats are best used in a decomposed, with alkali saponified, state, and serve as strong finishing mixtures for filling and loading, as a means to combine tightly the otherwise dry and dusty ingredients.

Among the wax species, the admixtures prepared as a means of finishing are the Japan, China (on the seeds of stillugia sebifera) Coccus-wax (upon Rhus succedaneum), and Bees-wax. More recently the American wax is added hereto. The waxes are likewise applied for finishing purposes, saponified with alkali, and often besides this also mixed with fat soaps.

Finally, mention should be made here of the Paraffine (Stearine), if it is prepared from bituminous coal, anthracite, pitch, petroleum, or oxokerite. The application of Paraffine, however, is connected with a number of specialities, but offers greater advantages than all other fats. Stearine and Paraffine should be well boiled with the loading and filling substances, but hardly ever previously saponified.

(To be Continued.)

Printing and Dyeing Receipts.

(Translated from the "Muster-Zeitung für Färberei, Druckeri," etc.)
Alizarine Violet on Calico.

Thickening	16 lbs.
Alizarine, at 20 per cent.....	1 lb. 11 oz.
Black liquor, at 20° Tw.....	141 ozs.
Acetate of lime, at 234° Tw.....	71 "

Aniline Violet on Calico.

The color is produced best by using starch or gum as thickener. The color is best employed in the form of a paste, so-called violet carmine, as being easy to mix. The shades are extremely brilliant if the cloth is prepared with Turkey-red oil (alizarine oil). The oil is mixed with water, and the cloth well padded in the mixture.

The following receipt gives good results if printed upon unprepared calico.

Color—

Starch	8 lbs. 3 ozs.
Water	24 " 12 "
Red liquor, at 14° Tw.....	16 " 5 "
Aniline violet carmine	5 " 10 "
Acetic acid, at 7° Tw.....	4 " "

Red Liquor.

Sulphate of alumina.....	9 " 13 "
Water	19 " 11 "
Acetate of lead.....	10 " 10 "

Dissolve, let settle, and set the clear at 14° Tw.

All aniline colors upon cotton yarns are greatly improved if the yarns are first prepared, even slightly, with Turkey-red oil.

Reddish-Brown on Loose Wool (40 lbs.).

Prepare for an hour in a beck of

Alum	4 lbs.
Red argol.	2 "
Chromate.....	13 lb.

Lift, let lie over night, and then dye at a boil for an hour with

Red wood	154 lbs.
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Grey Brown on Loose Wool (40 lbs.).

Boil for an hour with

Prepared tartar.....	4 lbs.
Fast brown, "G. and G".....	41 "

Leather Brown on Cotton Yarn (11 lbs.).

Make up a boiling beck of

Catechu	2 lbs.
---------------	--------

Give six turns and wring out. Enter in a water at 122° F. containing 24 ozs. chromate of potash; six turns and wring. Then dye up in a fresh water with alum and fustic liquor.

Baranna Grey on Cotton Yarn (55 lbs.).

Boil up 34 lbs. good catechu, 41 ozs. blue vitrol, 2 lbs. 3 ozs. logwood, and 2 lbs. 3 ozs. extract of bark. After extracting all well, cool down to 167° Fahr.; work the yarns for an hour; lift and add to the beck 31 pints nitrate of iron; re-enter, give six turns, take out, give five turns in a water with 141 ozs. chromate of potash; take out, and dye up with decoctions of logwood and fustic.

Burning Crimson on Woolen Yarn (20 lbs.).

Alum, free from iron.	4 lbs.
Tartar crystals	4 "
Solid perchloride of tin.....	6 "

Boil the water for five to ten minutes with some of the chloride of tin, skim, add the above articles previously dissolved in a little

water, boil up, cool down to 190° Fahr. with cold water. Enter the yarn, boil for an hour, turning well and take out.

Make up fresh water, boiling first with a little chloride of tin, and skimming. Then add ammoniacal cochineal paste, as may be required, along with a little tartaric acid. Boil gently for three-quarters of an hour, adding a little more tartaric acid if the ammoniacal cochineal does not work on well.

• *Cloze Red on Woolen Yarn* (25 lbs.).

Refined tartar.....	1½ lb.
Perchloride of tin.....	2 lbs.
Ground cochineal.....	1 lb.
Ammoniacal cochineal paste.	1½ lb.

Clear the water with a little chloride of tin, add the above wares dissolved as far as possible, boil for five minutes, cool, enter the yarn, and dye at a gentle boil for three-quarters of an hour.

Ammoniacal Cochineal.

Take 30 lbs. ground cochineal, mix well with 80 lbs. ammonia, stir well together, and let stand for eight days at a gentle heat, stirring frequently. It is then fit for use.

Natural Brown on Loose Wool (30 lbs.).

Fast brown (Guthrie and Gutze).....	7½ pints.
Extract of bark, solid.....	2 lbs.
Crude argol.....	2 "

Boil ten minutes, cool, enter the wool, boil gently for ninety minutes, turning well.

Light Blue on Loose Wool (100 lbs.).

Alum.....	8½ lbs.
Tartar.....	3 " 14 ozs.
Sulphate of tin.....	1 lb. 10 "

Boil the wool in it for two hours, and dye up in a fresh water with

Logwood.....	20 lbs.
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boiling for one to one and a half hour, according to shade.

Flesh Color on Woolen Yarn (20 lbs.).

Alum (free from iron).....	5½ lbs.
Tartar.....	2 " 10 ozs.
Perchloride of tin.....	7 "

Boil for an hour, and dye up in a fresh water with Cochineal..... 1½ "

Fine Medium Grey on Woolen Yarn (10 lbs.).

Prepared tartar.....	1 lb.
Glauber's salts.....	1 "
Chloride of tin.....	½ "
Ponceau lake.....	1½ oz.
Extract of indigo.....	21 ozs.
Archil carmine.....	5 "

Boil for five minutes, cool, enter, and boil gently, turning till the color is even.

Olives on Woolen Rags (Garments) (10 lbs.).

Alum.....	5½ ozs.
Sulphuric acid.....	4½ "

Boil for three-quarters of an hour, lift and add to the same bath

Picric acid.....	6½ ozs.
Extract of indigo.....	6 to 6½ "

Boil for three-quarters of an hour, lift and add

Archil.....	14 to 15½ ozs.
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Boil till even and wash.

Yellowish Brown on Half-silk Garments (30 lbs.).

Wash first at a hand heat with

Soda crystals.....	20 ozs.
Soap.....	10 "

Raise very well in clean water, take through weak sours of sulphuric acid, and rinse again.

Steep for three hours in the hot decoction of 3 lbs. catechu, turning from time to time; lift and work for 1 hour in a fresh beck of 20 ozs. chromate of potash, take through cold water, drain in the centrifugal, and dye up with 2½ ozs. of vesuvine or Bismarck brown, gradually raising the temperature; lift, add a few drops of sulphuric acid, give a quick turn, and drain in the centrifugal without washing.

Bronze Brown on Woolen Garments (8 lbs.).

Boil for ninety minutes with

Alum.....	3 lbs.
Chromate of potash.....	1½ oz.
Argol.....	4½ "
Bluestone.....	½ "
Tin crystals.....	½ "

Let soak over night in the liquid, rinse and dye in a fresh water with

Fustic.....	4 lbs.
Red wood.....	15 ozs.
Logwood.....	½ oz.
Sanders.....	1 to 1½ lb.

Boil from 45 to 60 minutes, working well. If needed, add a little more red wood and logwood, and then rinse in fresh water.

Porcelain Green on Woolen Yarn (20 lbs.) in Five Shades.

No. 1.

Prepared tartar.....	2 lbs.
Sulphuric acid.....	½ lb.
Picric acid.....	5½ ozs.
Extract of indigo.....	56 grains.

Boil up well, cool, enter the yarns, and turn for an hour at a gentle boil.

No. 2.

As before, but the extract of indigo is increased to ½ oz., and in Nos. 3, 4, and 5 successively to 3½ ozs., 4½ ozs., and 9½ ozs.

Magenta on Cotton Yarn (50 lbs.)

Add to a water at 144° Fahr.

Tin crystals.....	5½ ozs.
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and the solution of the same weight of magenta, which is added in two portions, giving six turns after each.

Catechu Colors on Calico.

A.

Catechu liquor at 14° Tw.....	8 pints.
Berry liquor at 21½° Tw.....	3 "
Sapan liquor at 11½° Tw.....	1½ "
Gum water.....	20 "

B.	
Catechu liquor at 14° Tw....	5 pints.
Berry liquor at 21½° Tw.....	1½ pint.
Sapan liquor at 11½° Tw.....	1 "
Bark liquor at 14° Tw.....	1 "
Gum water.....	10 pints.

Mode 1 for Calico.

Catechu liquor at 30° Tw....	10 pints.
Berry liquor at 21½° Tw.....	4 "
Sapan liquor at 14° Tw.....	2 "
Logwood liquor at 26½° Tw.	1½ pint.
Bark liquor at 21½° Tw.....	1 "
Gum water.....	25 pints.

Ditto 2.

Logwood liquor at 18½° Tw.	2 pints.
Catechu liquor at 14° Tw ..	1 pint.
Sapan liquor at 21½° Tw.....	1 pint.
Dextrine water.....	5 pints.

—Chemical Review.

Application of Chemistry to Textile Art and Dyeing.

(Continued from page 216.)

BORON, BO—11.

Boron is an artificial preparation in a crystallized and an amorphous form. With oxygen in combination it forms *Boron Tri-oxide*, Bo_2O_3 , generally known as *boracic acid*. It is chiefly found in Italy, abounding in the lagoons of Tuscany, where jets of steam impregnated with boracic acid, jets of which issue from fissures in the earth. The heat of these natural steam jets is made to concentrate the dilute solutions of boracic acid obtained from the Tuscan lagoons with the acid obtained from crystallization. Thibet, in Asia, also furnishes boracic acid. It is likewise supplied from California.

From the fact of its occurrence naturally, as we have stated, it is volatilized with the vapors of water. It is soluble in warm water, and somewhat less so in cold. The crystals it forms contain water, and on being heated this water is set free, leaving a fused vitrious mass of *anhydrous boron trioxide*.

Boracic Acid enters into combination with metals to form a species of salts known as borates, the most important of which is borax (*sodium borates*).

The Metals.—All these elements are collectively entitled *metalloids*, or non-metals; all others are named *metals*. It is somewhat difficult to distinguish between these two classes, the distinction, such as it is, being more general than radical, the simplifying of classification being the main object in making a line of distinction. There are about fifty metallic elements, and but fourteen metalloids.

All the metals, with the exception of mercury, are solid. They are also opaque at the average temperature, most of them possessing what is called metallic lustre. As conductors of electricity or of heat, they are superior to the metalloids.

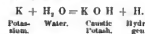
Hydroxides, or the compounds of metalloids with oxygen and hydrogen, have often a very pronounced character, while the

hydroxides of the metals, on the other hand, are, as a general thing, of a basic nature. These compounds of the metals are named *alkalis*. It is not at all certain that this class is to be recognized as a result of genuine chemical combination of simple mechanical union; whilst the compounds of the non-metallic elements with each other are well defined chemical individualities. Such are chlorides, sulphides, etc.

It is evident that all these elements of which we have spoken are capable of subdivision into numerous groups, all bearing a striking likeness to each other. Such is also the case with regard to the metallic elements, which are herewith described in their relative order:

Metals of the Alkalies, in which are included potassium, sodium, cesium, rubidium, lithium, only the first two of which are of ordinary occurrence, the other three being so very rare as to call for a mere mention. Coming under the distinction of metals of the alkalies we must likewise specify the metallic radical anionium and its salts, as follows: Of this group the metals at ordinary temperature are soft, but at higher temperature are volatile. They have a very strong affinity for oxygen. Thus formed the oxides eagerly combine with water, having very powerful caustic and alkaline properties. The carbonates and almost all of their salts, are soluble in water.

Potassium, $K=39.1$.—There are few metals of the alkalies more liberally distributed throughout the globe than the compounds of potassium. Their chief locality is to be found in the feldspaths, and a variety of other rock and soils, such as the salt deposits at Stassfurt and Kalusz, the ashes of plants and native saltpetre. In 1807 the celebrated chemist, Sir Humphrey Davy, discovered potassium. In our day it is prepared by subjecting a combination of potash and carbon in iron retorts to an intense heat; when the metal potassium distils over, is then condensed under naphtha, and finally redistilled for purification purposes. This metal is silvery white, is soft and bright. The lustre, however, is at once lost when it is exposed to the air, because of its great affinity for oxygen. It decomposes water when thrown upon it, as it at once combines with the oxygen liberating the hydrogen. This powerful chemical action evolves a heat so extremely intense that the hydrogen actually takes fire, burning with a purplish flame.



Several oxides are formed by the direct combination of potassium with oxygen at various degrees of temperature.

(To be continued.)

WANTS.

Manufacturers desiring help in any department, or persons seeking employment, can have their wants advertised in this column for the low rate of 25 cents per line. No other advertisement will be admitted in this department.

WANTED.—A situation, by a first-class practical piece dyer on fancy cassimeres, warranted, broadcloth, leavers, etc.; also, on heavy flannels. Has thorough knowledge of blue dyeing, both on wool and cotton, and patent indigo. Best of reference. Address, R. F. L. care of Textile Colorist, 506 Arch St., Philadelphia, Pa.

WANTED.—A first-class dyer will be open to an engagement on the 1st of November. Thoroughly understands the dyeing of cotton and wool and woven piece. First-class reference. Address, F. B. care of Textile Colorist, 506 Arch St., Philadelphia, Pa.

WANTED.—Situation by a Bradford piece dyer. Address, F. D. care of Textile Colorist, 506 Arch St., Philadelphia, Pa.

TEXTILE COLORIST.

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Philadelphia, November, 1880.

No. 23.

Colors, Tints and Shades.

No matter how complex or intricate anything in nature or art may be, it is possible to bring all such back to first principles; and this means of reduction to a primitive state we term *science*, or the art of knowing how. The dyer in this respect is truly an artist, and a scientist to a certain extent. Given any shade or tint however touched, and he can trace it to its source with as much accuracy as the geographic explorer can discover the spring from whence the most extensive of majestic rivers rises. The Nile is said to have several springs, and, like it, the great diversity of colors is traced back to three sources, called "primitive colors," out of which grow and expand, *ad infinitum*, the galaxy of beauty we revel in to-day.

The primitive colors alluded to are RED, BLUE, and YELLOW; and, being primitive, they are termed "simple colors," their derivations being a combination of two or all of the simple or primitive colors, are designated "compound colors." From these three colors the seven distinct tints of the rainbow are produced, by blending one into another, and in this Nature proves herself to have been the first of dyers, as well as the most infallible of artists, producing effects which baffle all the best efforts of Art to equal, not to say surpass.

But although Art can neither surpass nor even equal Nature in the production of tints and shades of color, she can at least imitate—and that to perfection—a point at which the artist must of necessity rest satisfied. That this imitation is all the time improving and progressing is evident when we look around and see the manifold beautiful shades of color which the dyer has already discovered, aided as he is by the laboratorial studies of the chemist. In fact, the dyeing art has so far progressed now that an entirely new state of things has arisen, and a wonderful reformation taken place in colors and chemistry applied to colors; and this remarkable reform has been the direct means of inaugurating shades entirely new and delightful to the eye.

The brilliant tints of color on water overlying a locality in which coal was present, no doubt gave the hint for the discovery of the aniline or coal-oil dyes; for science is ever on the alert for discoveries, and Nature is prolific of suggestive lessons.

Although the old style of dyeing gave more solid and lasting results, yet the sphere of action was very confined. The remarkable discovery of the coal-tar derivatives gave a magical influence to the dyeing art; and, under the title of *anilines* were produced a number of beautiful tints and shades which at once opened a new era in coloring which bids fair to grow in beauty and usefulness by illimitable changes and variations of shades which, while they multiply, seem to increase rather than deteriorate from their primitive beauty.

Chemical action has the largest, if not the sole part in the extraction of color from coal oil, the aniline itself being almost colorless (that is to say, of a very faint yellow tint). However, the chemical action of which we have just spoken draws out from it the

three simple colors, red, yellow, and blue,—whose blending gives the infinity of shades which so enhance the industrial value of the dyers' handiwork. So dependent is the production and multiplication of tints and tones of color on the tests of the laboratory that chemistry must yet become a positive necessity in the education of the working dyer. It has ceased to be a mere trade; it has now assumed the position of a *scientific art*, and, no doubt, will grow more and more in respectability and importance. The deep, watchful interest taken in the anilines by chemists cannot fail of advancing its claims to a high position; and the requirement of chemicals, judiciously employed, must ever prove a strong motive for that studious investigation which they are constantly undergoing by the chemists in both Europe and America at present.

The working dyer, too, is ever on the look-out for novelties in color, and those are sought to be obtained by means of blending together tints already known. His want of chemical knowledge, however, makes any discovery a mere matter of chance; and, as he probably keeps no record of his experimental proportions, he is but too apt, nay, too certain to fail in reproducing a successful shade. In fact, accuracy must not be made dependent on memory. Even the most experienced chemical expert would be very liable to error if he ventured to depend on memory alone—how, then, could it be otherwise than disastrous to the uncultivated operator?

There is a great deal of discriminating taste demanded for the blending of colors. As in music, either harmony or discord will be the consequence of uncertain judgment, or want of educated skill; the harmony may be created by chance, but the discord is most likely to be the certain result.

Practically, the dyer has greatly the advantage of the chemist in the continuity of tint; for, although the latter can specify to a nicety the ingredients and liquors required for the operation, the former having the actual manipulation of the recipe can match tints with a positive correctness and accuracy the chemist's theory could not possibly attain.

This goes to enforce the necessity for unflinching watchfulness and study of effects on the part of the dyer, so that he may strike the desired shade, or blend two or more tints to create still another. For, it is possible to multiply them *ad infinitum*.

Use of Mordants.

BY PROF. J. F. ELSOM.
(Continued from page 22.)

A third and very common method formerly was to apply the mordant and the coloring materials together to the fibrous substance or the matter to which it was desirable to impart the color. We find upon examination that in piece-dyeing in dilute liquid this plan is no longer recognized as a good one. There are many good reasons for this, among which may be mentioned the tendency to form insoluble lakes in the solution, which, depositing only on the

external part of the fibre, give results very far inferior to the methods spoken of in previous articles, and this, too, alike as to stability of color, depth of shade, and evenness or regularity of the dye. In calico printing, or in padding, says a good authority, this method is of extended application in some sections of the country, and the inconveniences experienced in common dyeing are not perceptible, owing to the greater concentration of the mordanting salts and the use of thickening matter. Lakes are doubtless formed to some extent during the preparation of the mixture, but, with gum or starch, the insoluble lake is in an extremely fine state of division. In such a mixture there is always present an acid or an acid salt, such as acetic acid, oxalic acid, tartaric acid, or alum, chloride of tin, cream of tartar, or binxalate of potash. These tend, continues the writer, in the first instance, to restrain the formation of a lake, and afterwards, where the fibre and the mixture of a mordant and coloring matter are submitted to heat, as in the process of steaming or stoving, facilitate the solution of any lake formed, which thus finds entrance into the fibrous matter, and there undergoes combination with it, owing to decomposition of the mordanting salts.

Having thus, from all known authorities, together with practical experience, gleaned a few facts relative to the action (chemical action) of mordants in coloring fabrics, there remains the practical feature of the whole business of dyeing to be discussed. I feel when I start to talk to such a large family of experienced dyers that pride themselves on being classed among the readers of *THE COLORIST*, my own inferiority and inadequacy to advance anything new in relation to this great and rapidly increasing industry, nevertheless the attempt will be made, and I trust something may be gleaned by experience from the theories advanced from a chemist's standpoint, for in this discussion I hope to keep clear from the clashing of prejudices—if such exist—and present facts, for notwithstanding whatever differences of opinion may exist we all want to become wise and efficient in any calling.

"Accept the truth where'er it may be found:
Among our friends, among our foes,
On Christian or on heathen ground."

Trusting, then, that all understand by this time the *rationale* of the practical processes of dyeing from the foregoing preliminaries and observations, I will state that in order to give a fairly comprehensive account of these, I shall, for convenience sake, take the colors in the old arrangement, viz. simple and compound colors.

The question of the chemical or technical mathematical exactness of what produces any described color or shade will not be met to discuss in this connection.

Red, blue, and yellow are supposed to be simple or primitive colors. The method of obtaining these being given, then follow the colors resulting from the admixtures of any two or more of the elementary colors, as green from yellow and blue, orange from red and yellow, and purple from red and blue. The colors not included in the above, and in the dyer's philosophy made by mixing the three elementary colors, red, blue, and yellow, in different proportions—namely, the browns, grays and chocolate, and black—will

be conveniently treated of after those supposed to result from the mixture of two of the primary colors.

This arrangement, though perfectly arbitrary, is both convenient and consistent as regards dyeing: for though modern discoveries in optics may conclusively prove that blue and yellow do not make green, and may in other respects disturb the older ideas concerning primitive and secondary colors, yet the dyer has sufficient justification for retaining the old system, because he can show that his blue and yellow always made green, and that the proper mixture of the so-called simple colors produces a compound shade which can be calculated beforehand from the proportions of the respective colors employed.

In my next, contribution will be found a discussion of red colors.

Warren, Pa., November, 1880.

(To be Continued.)

Incendiary Silk.

We have been politely furnished with the printed copy of the Report of Committee on Police and Origin of Fires of the New York Board of Fire Underwriters on the momentous subject of spontaneous combustion of Black Silk. It will be recollected that in our issue for May last we treated this subject as one in which a large interest was deeply concerned. Professor E. Le Franc, who was at that time assistant editor of this paper, investigated the cause of the combustion of some black silk yarn found in a burning condition in a box in a freight car on the Reading Railroad, in the immediate neighborhood of other goods which were found to be in perfect order; and, as stated by the Superintendent of the road, Mr. Royer, such cases of combustion were frequent amongst silk yarns transported from Paterson, N. J.

The reports are exhaustive and interesting, and no doubt some light has been thrown on the subject by the scientific experts whose opinions are therein given.

But, after all, the question of the spontaneous combustion of weighted silks is far from being settled. Ignition from external causes is clearly without a shadow of foundation, so that internal combustion is unquestionable—and the decision to be arrived at is: how did that combustion originate?

We should be slow to condemn the process of silk weighting carried on either at Paterson, N. J., or elsewhere, and would rather look for the origin of this mysterious destruction in some other quarter. But yet, the fact remains that spontaneous combustion has occurred in several cases amongst weighted silks on railroads, on shipboard, and in warehouses. It would appear that condonnment, or, as it is called, "sewing," is the most liable to this hidden combustion, because of the twisted strands being in some parts clogged by the weighting material; and, if the conclusions of the chemists be at all reliable, this weighting compound is impregnated with insidious destructives, of which it is alleged that tannic extracts, in combination with fat-oils and vegetative as well as animal fibres, facilitates spontaneous combustion by influence of capillary agency and fermentation." We quote from the "Analysis and Report on Corded Silk," by Drs. Krackowizer and Harshish.

But, after all the testimony, crude or chemical, on the side of internal spontaneous combustion is heard, we find an adverse authority in Hayden M. Baker, chemist, who avers that "chemical action within the silk (package) is conducted away by the atmosphere as fast as it is released, consequently accumulation to a degree essential to ignition cannot take place."

Professor Baker declares his belief in the fact of spontaneous combustion, but differs from the other experts as to its origin. Now we would venture to put in a suggestion, which is—that the weighted silks in question were not sufficiently dried after coming from the hands of the dyer, and being closely packed, whilst in a moist state, generated a gas which, so confined, consumed its surroundings, and when laid open to the air the smoldering mass instantly burst into flame. Dr. Krackowizer, in his chemical analysis, finds that "the hygroscopic water shows a surplus of 1.61 per cent., in comparison with the usual hygroscopic absorption of silk 5.00."

Now, we would like to know how this degree of hygroscopic moisture, small as it is, came into a package closely confined from air? Was not this moisture discovered by the doctor the simple dampness remaining after the undried condition of the silk as it left the dye-house?

As to confinement in close packages, in air-tight boxes, or in boxes with air-holes in them, weighted silk is known to have generated heat sufficient to combustion when laid away in open places. W. C. Wyckoff, Secretary of the Silk Association of America, speaks of an instance where a case of spontaneous combustion occurred amongst some silk on a shelf in a store in Paris. In Russia, too, and Germany, cases have occurred, going to prove that our American dyers are not more accountable, if at all so, than their co-laborers across the Atlantic.

Be it as it may, we trust that this unfortunate tendency of silk, above other textiles, to inflammability, may be corrected, and the fears of insurance companies, railroad and steamship proprietors, and others, be set satisfactorily at rest. At present we have but the simple facts of spontaneous combustion. What we now want is a preventive check. Can we not have it?

Ostrich Feather Dyeing.

BY PAUL ALEX, PRACTICAL FEATHER DYER.

(Continued from page 224.)

GARNET.

As garnet is at present one of the most popular colors, I will say a few words with regard to its production. It is a color that, if properly made, will improve the worth of the feathers rather than injure them. In order to produce a pure clear color it is necessary to have white feathers; as, in a bright shade of garnet, the least streak of grey shows, whilst in a brown it does not. Some dyers, I understand, use anilines, but how they can get satisfactory results is something which I cannot comprehend. I use wood dyes exclusively, and with the same bath, without lessening or adding to the strength, I can make from the lightest to the darkest shades. It is a very delicate bath and color. The smallest grain of acid soap, or grease of any kind, will spoil a whole bath; therefore the dyer must exercise great care. Again, in dyeing I have found that the

less starch used the better, and were it possible to dry the feathers without its aid, it would add considerably to the brilliancy of the color; and if allowed to dry alone without aid of bran or starch the color will be found about two shades darker than they would otherwise be. To produce an extra rich and brilliant dye, when your feathers have been submerged about six or eight minutes, take them out and rinse them, drying rapidly. In the meantime, let your bath be warmed up to the nearest temperature to boiling. But be careful not to allow it to boil. When the starch is completely removed, re-enter and let remain until the desired shade is obtained; in every case it is always best. Should your feathers become spotted, be too dark, or suffer by any accident occurring to them, extract your color as I recommended in a former article. Mix a new bath, exercise more care, and you may confidently look for satisfactory results. I have found it is always best to remove all your chips, if you use chip logwood and have liquid enough to cover all your feathers. Leave no ends protruding. Do not press them down hard, or too close to your basin, but allow them plenty of room, and, if possible, any other than a copper boiler or basin to boil your bath, or to contain your feathers.

(To be continued.)

Wool and Cotton Spirits.

Often having inquirers on this subject, we think we cannot benefit many of our dyers better than by presenting in our pages the following extracts from the recently issued second edition of *Smith's Practical Dyers' Guide*, a work which gives valuable information on this special subject; to which we would call the studied attention of our practical readers:

NITRATE OF TIN.

Nitrate of Tin, such as is used for dyeing scarlets and other fine fast colors, is made of single Aquafortis (Nitric Acid at 32° Twaddell). This should be rectified Aquafortis, and be clear of the red fumes, otherwise it will be subject to fire in the killing of it. To every pound of this Aquafortis add by degrees 1½ oz. of Feathered Tin, not more than one or two handfuls should be added at one time; this must be added from time to time until the whole has been eaten up in the Aquafortis. In this state it is said to be "killed," and if properly "killed," and not "fired," it will be of a bright amber color, resembling pale ale, and is then ready for use. It is generally killed in large earthenware bowls, holding about 12 gallons each.

If the spirits are "fired" they will not dye a bright color, therefore are worthless for such purpose. Spirits are said to be "fired" when the Tin is dissolved too rapidly, and when by heat they are converted into a bichloride. In this state the spirits are of a brown color, and much sediment will be found in the bottom of the bowl in which they have been killed. Practical dyers always prepare their own Nitrate of Tin in this way.

To feather Tin, take a quantity of the best Grain Tin, and melt it in an iron pot or ladle, and then pour it while in a melted state, but very gently, from a height of four or five feet into clean cold water, say into a half-cask or some other vessel of convenient size. By this means the Tin is formed into fine thin flakes, and in

this state it is easily dissolved in the Acid. Tin in this state is used for "killing" spirits of all sorts; such as Nitrate of Tin, Muriate of Tin, Nitro-muriate of Tin, and Murio-sulphate of Tin.

To make Nitrate of Tin requires more care than any other sort of dye spirits, inasmuch as it requires to be fed gradually with the Tin, to prevent its being fired. Any of the other sorts of spirits may be fed with large quantities of Tin, not being subject to "firing" like Nitrate of Tin. Nitrate of Tin is the mildest and best for dyeing yarns, woolen cloths, and other fabrics, yellow, orange, scarlet, and other fine colors, especially those where Cochineal and Lac Dye are used in the dyeing of them.

There is another form in which grain Tin is used by the Practical Dyer. This is called "Bar Tin," and is in the shape of small rods, and is used in the place of "Feather Tin" for killing "Nitric Acid." This is an ordinary article of commerce, and is sold in this state. These bars or rods are placed in an upright position in the Acid, where they are gradually eaten up by it. By this means the Acid is "killed" without much danger of firing, if it is properly rectified. The rectifying of the Acid is managed by the manufacturer of it, and not by the dyer. It comes to the dyer ready to be "killed." Some large dyers kill for their own use from two to five hundred pounds every day. Such men know as soon as they pour the Acid from the carboy whether it will be subject to "fire" or not.

SINGLE MURIATE OF TIN.

To make Single Muriate of Tin, put say a hundred pounds of Spirits of Salt ("Muriatic Acid" of 32° T.) into an earthenware jar, to which add 2 ozs. of Feathered Tin to each pound of Acid. Let it stand until all the Tin is eaten up, when it is ready for use. If it be put into a carboy it will keep for a long time. When Double Muriate of Tin is required, add double the quantity of Tin; but in that case the jar must be placed upon a hot sand bath, or in hot water where steam can be applied; heat must be applied or the tin will not dissolve and be eaten up by the Acid. More sugar can be dissolved in hot water than in cold, just so in this case with tin.

CRYSTALS OF TIN.

To make Crystals of Tin, add to every 30 lbs. Spirits of Salt ("Muriatic Acid") 10 lbs. Nitric Acid. Heat the Acid to 200°, and keep it up at that heat, adding by degrees Feathered Tin until it will eat up no more. Let the solution cool gradually, after which tin crystals will fall down in small flakes, and which must be collected and dried at a gentle heat, and which are then ready for use.

OXMURIATE OF TIN.

Take five parts of water, one part Crystals of Tin, and half the quantity of Muriatic Acid; bring this up to a boil, then add gradually and very cautiously, drop by drop, Nitric Acid, until no fumes or effervescence are produced. Let it then cool, when it will be ready for use.

"BARK," OR "YELLOW" SPIRITS.

To every 4 parts Muriatic Acid add 1 part Double Sulphuric Acid gradually and cautiously; to this add Feathered Tin after the rate of 1½ oz. to each lb. of mixed Acid. When the tin is all eaten up, it is ready for use. These Spirits are sometimes called "Bark Spirits," because they are often used in dyeing yellow colors with Quercitron Bark.

FINISHING SPIRITS.

Finishing Spirits are made exactly like the Yellow Spirits. These spirits are used for giving a bloom to Prussian Blues or Worsted or Woolen Cloths; but Muriate of Tin is a better sort of spirit for these Blues, there being quite enough of Sulphuric Acid in the "Blue Spirit" used in the dyeing of these colors. I have therefore substituted Muriate of Tin for Finishing Spirits in the receipts for the dyeing of those Prussian Blues.

BLUE SPIRITS.

The Blue Spirits used for dyeing Prussian Blues are made as follows: Into a carboy of 12 gallon size, put 4 gallons of Muriatric Acid; add to this 2 gallons Nitric Acid, then add very cautiously 1 gallon Sulphuric Acid. This done, cork up the carboy and cover it with a body of stiff clay, so as to keep all the gas that you possibly can from being carried off, for much strong gas will arise in the making of these spirits. This spirit is ready for use the next day, after which it should be kept airtight to be preserved for future use. These few sorts of spirits are about the only sorts that are required in the dyeing of worsted and woolen fabrics; but there are a few other sorts required for dyeing cotton, both in a raw and manufactured state. The receipts for these I will give, from which the practical dyer may obtain any spirit color,—that is, any color requiring spirits with which to dye it.

COTTON SPIRITS.

The best spirits that I have discovered for the dyeing of cotton generally, is made as follows, and the dyer requires no others if he uses these proportionally, according to the color he has to dye. I have shown how, and at what strength they are to be used in many of my receipts:

To every 4 lbs. of Muriatric Acid (Spirits of Salts) add 2 ozs. "Feathered Tin;" let the Muriatric Acid eat up as much of the tin as possible; when it has done so, add to it 2 lbs. of double Nitric Acid (Double Aquafortis); the Nitric Acid will assist the Muriatric Acid to eat up all the Tin. When it has done so, it is ready for use and will keep good for any length of time, if bottled and corked.

NITRATE OF COPPER.

To make Nitrate of Copper add old or new pieces of copper plates to Double Aquafortis until it will eat no more. After cooling and settling it is ready for use.

SILK SPIRITS.

For the dyeing of silks there are several sorts of solutions of Tin which have a tendency to give different tints and hues to silk. But, one sort, the "Plum Spirits," are generally used for making up the various dye-vats or dye-tubs. The term tub is often used for vat or bath, because the vats and baths are made of deep casks, where the drugs of the decoctions of woods can settle to the bottom of them. For plum vat the dyer often uses the term plum tub or plum bath, both meaning the same thing.

PLUM SPIRITS.

To make Plum Spirits, add to 100 lbs. of Muriatric Acid 20 lbs. of Nitric Acid, at 32° T.; then add to these mixed acids 1½ oz. of Feathered Tin to each pound. The tin must be added by degrees, as in the making of Nitrate of Tin. To dissolve the whole of the tin a little heat should be applied. When the spirits have

settled they are ready for use, and will keep good for any length of time. These spirits are used for various silk vats where wood decoctions are used, such as logwood and peachwood, and they will answer for all silk vats.

NITRATE OF IRON.

To make real Nitrate of Iron, add old iron-hooping or iron borings to Double Aquafortis until it will dissolve no more. Let it settle, when it will be ready for use.

Nitrate of Iron, such as is now generally used, is made by adding Copperas to Single Aquafortis until it will dissolve no more. Some makers of it add heat, to get it up to a high strength. It is made in large casks or tubs.

Bleaching in the Warp.

While some bleachers, such as Mr. Pontiggia, take the trouble of complicating the process of bleaching, through patents that nobody will ever dispute nor apply, other more practical methods are opposed as being far better adapted to the economical requirements of our progressive age. The *Moniteur des Filés et Tissus* brings out the fact that bleaching can be and is done successfully in the warp, as follows:

Instead of finishing the yarn before bleaching, the cotton warp is taken from the first drawing and coiled on tubes of india rubber or any inoxidable substance to be subjected to the ordinary process of boiling and bleaching. The vacuum Kiers seem to be more fitted than any other recipient. The caustic liquor is, heated as usual, and spread over the goods, by the steam, through the spouts, during four hours. After the boiling and rinsing, the tubes are taken out and passed through the hydro-extractor. Thence the goods go into the bleaching liquor, which is withdrawn and returned at intervals—eight times—during four hours, followed by the usual washings and scourings.

Being dried by exposure in the drying room for thirty hours, the tubes are easily separated from the warp which follows the regular course of drawing and spinning.

There are notable advantages in this method of bleaching cotton in this almost raw condition. The yarn is finer, more uniform, and is stronger.

M. Rusch, of Bottendorf, near Vienna, is the originator of this procedure, which he applies successfully himself. The treatment of 10,000 lbs. cotton warp takes about forty-eight hours, and consumes 580 lbs. of various ingredients, as follows:

Carbonate of Soda.....	200 lbs.
Lime.....	100 "
Chloride of Lime.....	80 "
Acide phosphoric.....	5 "
Sulphuric Acid.....	50 "
Soup.....	5 "

Suggestions on Feather Dyeing.

(Continued from page 222.)

B.L.A. K.

Up to this we only had to take the coloring matters furnished by commerce and apply them to the feather, without subjecting it to anything like a tedious dressing. Now that black is required, we shall on the contrary, have to familiarize ourselves with processes

essentially different from the former; for our color is not entirely formed; it must be produced upon the substance required to be dyed. I shall here remark, parenthetically, that it would be a very desirable thing to succeed in manufacturing black coloring matters in the same way in which we have succeeded in obtaining red, blue, green, and violet ones, since the dyeing operations would certainly gain thereby a saving of time and perhaps of money. These operations would be considerably more simple and more easily conducted, while losses sometimes of a certain importance, and due to negligence or incapacity, would be less frequently incurred. Up to the present day, however, the industry of coloring matters, which in other directions has achieved such admirable results, has succeeded only to produce so-called direct greys and blacks, which are very far from giving even middling fair results.

Feather-dyeing forms, so to speak, a specialty quite apart, which has nothing in common with color-dyeing. In fact, special work-shops are set apart for this branch, and special workmen are employed in it.

The procedures by which feathers are dyed black are really the same (identical), and it is only the details which differ from one another. These details are often nothing but the prejudices growing out of a benighted empiricism, but on which, in certain cases, nevertheless depends the success of the operation. The dyeing of feathers in black demands minute attention, and assiduous as well as accurate labor.

It is true that the different sorts of feathers behave differently in black dyeing; but, after all, these are only differences of temperatures and attention, or of time.

As in this case the dyeing of the ostrich feather is of most importance, I shall describe as conscientiously as I can the manipulations to which it is subjected. This being done, I shall find no difficulty in making people understand how the other sorts of feathers are treated; finally, I shall proceed to elucidate the question of the dyeing in black of skins, wings, and birds, which gives rise to procedures entirely different from those already described.

BLACK DYEING OF OSTRICH FEATHERS.

The procedure of dyeing feathers in black which most generally observed, which is applied with most chances of success, and which insures the most favorable results, is the one founded on the employ of logwood and an iron salt. The reciprocal action of these two substances is very complex, and no theoretical exposition thereof is attempted here; we only have to treat of the result: that of a coloring black matter, insoluble in water, being produced. Generally, neither the logwood nor the iron salt is employed alone, but use is made, at the same time, of tanning matters, such as gall-nuts or sumac, terra, sulphate of copper, verdigris, etc. Many other substances are added thereto, but the basis remains always the same. Sometimes the feathers are dipped into a decoction of logwood and tanning matters, and then the black is obtained by steeping the feathers in a solution of the iron salt. It is, however, much more simple and expeditious to prepare only one bath and to mix all these substances together; for it has been proved that, although a reaction is produced amongst them as soon as they come in contact with each other, the feather is none the less properly dyed, since the

black settlement which is then forming is in very good condition to unite with the feather. The details of procedure are not the same for every variety of ostrich feather. Let us see the easiest case, that of the black one, which only needs a very slight covering. Delicate tests were applied for arsenic, but without result.

The black ostrich being in general fairly clean, a half day's soaking in lukewarm carbonated water is sufficient. They are threaded and bundled; then immersed in a black bath treated to 75° C., and left in as long as required for the richness of the dye, taking care to heat over occasionally. If, for example, the bathing lasts 18 or 20 hours, the reheating must take place three or four times during that period. In such case the feathers must be removed from the bath during the heating, in order to subject them to a uniform temperature. This facilitates the utilization of baths already used. Sometimes, when the feather is of a good natural black, and the bath of a rich dye, a single immersion gives the final dye. Then there is no necessity for keeping over an exhausted bath.

The utensils used are conical tanks hooped with iron, and wider at the base than at the rim; with coils for heating by steam. A metallic tub, with a jacket and a plunging sieve, containing the feathers, with a block lifting or lowering at will, is still preferable as an easier and faster method where quantities are dyed. With such a recipient, of a known capacity, the chemicals can be more accurately employed for a regular quantity of feathers. It must be remarked that the gray ostrich, being more bulky, the ingredients must be put in proportion. As, generally, these tubs contain respectively 20 kilos of ostrich, we will put in a logwood infusion, just to allow the addition of this lot of feathers without running over the liquid. This infusion of logwood is prepared by extracting 40 kilos of campany in 400 litres of water, in a pressing apparatus. To this liquid of the dyebeck an addition of one kilo Sumac completes the bath for a first boil of 20 minutes. Then comes the following addition:

Cupreas, 3 kilos.
Sulphate of Copper, 3 kilos 250 grammes.
Verdigris, 3 kilos 50 grammes.

The bath is agitated with sticks to help the dissolution of these salts. From yellowish, the bath turns a good black. Then the therm meter indicates when the bath is at 75° C. The feathers are immersed gradually, stirring well to produce complete saturation. The uniformity of the temperature at 75° C. is necessary to prevent burning the feathers. When the saturation and the immersion are secured, the cover of the tub is set on, to prevent the loss of heat, and the bath is left alone to attend to other operations. When the bath is cooled, a reheating takes place, as aforesaid, to bring it back to 75° C. Generally, this heating is done the first thing in the morning, at noon, and evening. The feathers must invariably be taken out before this reheating, and restored in a temperature of only 75° C.

One point is important, though often neglected, namely, that concerning the airing of the feathers. This is easily done when the reheating takes place. The value of airing lies in the fact that the oxygen of the air is absorbed by the iron salts and contributes to the production of a good black. This airing operation must be done carefully and prolonged towards the end of the operation, be-

cause the feather becomes more and more refractory to the oxygen influence, to say the penetration of the air, on account of the dye-covering. One or two days are not too much, then. The feathers are spread to air on the surface of a terrace, or a yard. They must be turned over once in a while to allow the general action of the air. The best method is to suspend them to clothes-lines, like washed goods. The circulation of the air through them is then as perfect as possible. The indications of the termination of the operation lie in the fact that the stems begin to turn reddish. The friction of the hair also shows the completion of the work.

The washing operation which finishes the dyeing is often done too coarsely and too hastily. To obtain a good result the feather must be soaped carefully by hand on a plank, with good Marseilles soap. This washing must be done until the water is no more polluted by the discharge of the dye. There is no economy in skipping this finishing touch. The goods acquire from it a value compensating for the labor expended. This chemical and mechanical operation gives a neatness and a brilliancy to the feather, as it does to silk, in removing all superfluous matters, and in perfecting, by the detergent action of the soap, the color and cast of the black, which becomes soft and brilliant. Heretofore the ostrich feathers dyed black used to be triturated in a boiling soapy bath. This imperfect and inconvenient method has been superseded by the plank washing and friction with abundance of good soap and muscular action.

(To be continued.)

Marius Moyret on Bleaching.

The general treatment of cotton yarns, or of mixed staple, such as cotton, wool and silk, says Mr. Moyret, is carried on in a system which is very injurious to the fabrics. This injury is not perceptible in the raw tissues, but it soon becomes evident where they undergo the process of boiling, dyeing, &c. Hot water and even soap are then the deteriorating agents of the already damaged goods which have no more a resisting power sufficient to bear the action of heat and alkalis. Patient investigations have resulted in a new mode of treatment which obviates this inconvenience. It consists in boiling in a preparation composed of acids, such as acetic, phosphoric, and arsenic, in weak dilutions. But once boiled in such an acidulated bath, the fabrics must necessarily be dyed in acidulated dyes. The only alkaline baths permitted then would be soaps, at moderate temperatures—30 or 40°. For mixed goods, especially with silk, there is more complication in the case. A neutral agent is required. Careful washings in pure alcohol, with sometimes the addition of a percentage of muriatic acid, are necessary to remove all the fatty and resinous matters left in the fabrics. Distillation can recuperate the alcohol thus employed.

[Probably correct, but not simple nor economical enough for large industries.]

Ozone on Black Aniline.

In a scientific study of black aniline, the *Teinturier Pratique* says: After all, chlorate of copper and the new-corn (vanadium) are in principle superseded by ozone, or autozone, the essence of oxygen. It appears that the action of chlorate of copper and of vanadium on the salt of aniline is merely caused by the presence in them of ozone as the acidizing agent pro-

ducing the black reaction. It also appears that pure ozone has more power to prevent the greening of the black than any of these oxidizing metals. This discovery of the essential principle of a pure aniline black is important, inasmuch as that it will dispense with the use of the costly vanadium; since ozone can be had at 10 cents per pound in the shape of chlorozone, which is the only cheap mode of producing it industrially. [The author of this essay reports that he has practically verified the above fact thus: "An experiment," he says, "has demonstrated that, contrary to general belief, the salts of copper has no intermediary action between salts of aniline and the oxidizing atmosphere."]

I have suspended some pieces of cloth impregnated with aniline salts in jars containing a little ozone, autozone, or chlorine, mixed with some air. I have obtained a black very rapidly. Having made comparative experiments with aniline salts, mixed with salt of copper, the black developed similarly, as if the copper was absolutely without any action whatever. M. Coquillon and M. Goppshroeder have since confirmed this observation.

The conclusion, then, is:

1st. Contrary to the general opinion, copper does not act here as an oxidizing agent.

2d. Aniline black can be obtained without chlorate or copper, by the action of ozone, autozone, or chlorine on chlorhydrate of aniline.

Let us remark here that autozone and chlorine are constituents, or forms, of oxygen, as ozone is its essence.

The following paragraph of a circular recently published in New York on chlorozone and its advantages, corroborates the above. It says: "Chlorozone dissolves and freely diffuses salts, or oxide of aniline, and causes a rapid precipitation of the coloring matter on the goods. Having the characteristics of chlorates, it acts as an oxidizer on dyed or printed fabrics, principally by ANILINE BLACKS IN COUNTERACTING GREENING," &c.

Chlorine.

This element is a derivation of the Chlorides, and is the great modern agent by which bleaching is effected. It is in itself a most noxious gas, and produces suffocation when inhaled. It is an admixture of vitriol with bleaching powder, and is therefore the actual bleacher. When first introduced for the bleaching purpose by the chemist Berthollet it was used as a gas in the same manner that sulphur is used with woolen goods. This chlorine gas was used in the form of a solution in water until some time afterwards, when the chlorine gas was combined with lime to form chloride of lime.

The principle on which chlorine works is that it effectually destroys color and leaves the ground white, for the reason that it combines with the hydrogen contained in the colors so as to form hydrochloric acid. It would seem, however, that water has a claim to this action, the oxygen of that fluid being the real bleaching material. The ground for this latter conclusion on the part of some theorists is that dry colors are not destroyed by dry chlorine. But, whichever belief is the more correct, it is certain that coloring mat-

ter in itself is an accurately balanced arrangement of the atoms of carbon, oxygen and hydrogen composing it, which nicely balanced arrangement, if destroyed by the removal of any of its component parts, an entirely new transformation is the consequence. Although there is really nothing tangible to lead to the belief that this fresh arrangement will produce a colorless body, yet such is the fact—an accidental fact, however,—and we have no reason whatever to assume the foregoing to be an essential property of chlorine. Some substances, on the contrary, have a color communicated to them by chlorine; for instance, the colorless solution of aniline, which under its influence becomes purple; or white silk or woolen, which it changes to a yellow.

When warm and concentrated, chlorine acts upon cotton with very considerable energy, and, should the contact be unduly prolonged, it acts injuriously even in the cold and diluted state. Therefore, it becomes strictly necessary that in all chlorine treatments the chlorine be very well got out of the cloth just as soon as it has performed the task required of it.

Strikes in Silk Spinning.

The French tinctorial press comments on the strikes of the female spinners of Alsace. The operatives want their wages raised to 155c. (30 cents) per day, while the manufacturers limit the same to 1 25 (25 cents).

The *Textile de Lyon* remarks, with other journals, that the strikers have lost, and will lose already more than the amount they claim by their voluntary idleness, and further says that the limit of 25c. decided upon by the employers is not an act of voluntary assumption. It is the result of a self-defence policy forced upon them by inevitable circumstances, and foreign competition inciting the trouble. Capital is not the enemy of labor, nor is labor the enemy of capital, as is too often declared. There is a common enemy between the two apparent antagonists. This real enemy is *foreign labor*, invading the national welfare under the cover of free trade at the expense of the French operatives. The whole trouble lies in that lamentable fact.

Crystal Soda.

The crystals produced by sal soda from the old LeBlanc process have a crystallization quite different from those of ammoniacal soda. The first sort is compact, hard, heavy and dull; it represents 32 and 33°. The second is porous, brittle, light and brilliant; it reaches from 34 to 35° without effervescence. It contains no chloride, no sulphate, no causticity. Its porosity allows the extraction of the mother liquor by Loyde's extractor. It is, in fact, carbonate of soda almost chemically pure. However, there is some prejudice against it, and some preference for the old procedure, because it is erroneously believed that porosity indicates the presence of sulphate of soda, and because it does not taste like caustic soda. The absence of causticity is a quality and not a fault, and the porosity is just the proof that it contains no sulphate of soda—which is the very ingredient that crystallizes hard and compact, and serves as an adulteration of the article.—[*Textile de Lyon*.]

(Translated expressly for the TEXTILE COLORIST.)

Analysis of Silk Weighting.

BY MARIUS MOYRET.

The analysis of loaded silks, dyed or undyed, is a most delicate operation. For a long period the process of discharging the loading matter has been in practice, with some success. Of course, if silk is apt to receive any saturation it is equally subject to the loss of it. Loaded silk can be unloaded by methodical washings in carbonate of soda and diluted chlorhydric acid alternately, with the exception of the use of oxides of tin and of the barytic compounds, which can not be so treated. But as an analytic process must not be based on exceptions, we have, after numerous experiments, adopted the process of per centing the azote in the silk as a means of controlling the loading matter. After various analysis we have found that raw silk, deterged or supple, with an average of 10 per cent. moisture, contains effectively 17.60 per cent. of azote.

Therefore, if a loaded silk had no azotic weighting it would be sufficient to recognize the ordinary dose of azote to have the real weight of the silk. But as there are generally azotic matters in the loading, the problem is more complicated. It is then necessary to discharge this weighting. They may be composed of gelatin, of prussian blue, and other coloring matters of azotic characters, specially combined with this blue which plays a great part in the black and dark colors.

The discharge is done in two ways, either for deterged, raw or supple silks. The deterged containing prussian blue being the most difficult to treat, we will begin by this special sort called *cuites*, or boiled.

Discharges: All the foreign azotic matters, colors, glues, prussian blue, &c., are removed by a wash in carbonate of soda at a heat of 80°, followed by a bath of chlorhydric acid of a weak dilution. This operation must be repeated two or three times.

The black becomes brown and remains greenish until the blue is entirely gone. The silk then is never injured. The silk dyed with aniline colors retains a certain cast, but the azotic quantity of aniline being small, the general result is not affected.

Discharge of raw and supple. In this case the bath of carbonate of soda cannot be employed at 80° temperature, as it would remove the natural azote of the silk by deterging. It is useless to have such a heat, since the coloring matter is less solid on this class of silk. The carbonate of soda is replaced by caustic ammoniac, which has no effect on the natural gum called *grec*.

The discharge being accomplished, the natural azote must be per cented from the pure silk. It is done as follows:

Take a given weight of silk, say 2 grammes; dry it well and weigh it again, to have a sure, known quantity. Cut it thinly and mix it thoroughly with some caustified soda. Heat this mixture moderately in a glass tube, and all the azote of the silk will be generated under the form of ammoniac. This ammoniac being dosed by an acidulated liquor, of a known degree, will give the weight of the azote so produced. This method is the same followed for fertilizers by Ville, Warrentrop and Bobierre, which is generally familiar to chemists. Supposing that the two grammes of dyed silk have

produced 0.25 of azote, the following proportion will easily be calculated:

2 grammes pure: 0.176x2:: x: 0.25 2: 0.352:: x: 0.25, hence 2x 0.25 o. g. 1420 pure silk, from which 0.1420 g. pure silk in 2 gr. loaded silk, giving $\frac{1420}{100} = 0.710$ per one gramm.

It must be understood that this operation indicates the quantity of silk, either raw, deterged or supple, without reference to the artificial yield of the dye which is neutralized by the discharge. Therefore, being given the neutral weight of the pure silk by the analysis, any surplus in the dyed will be admitted as artificial. It is important for the analysis of satia, taffetas, faille, serges, &c., which are the only class offering some interest to this process, that the warp and the woof be treated separately and well untwisted, because they are often loaded differently.

In case of silk mixed with cotton, the cotton is of no object, since it contains no azote. Wool or silk is rich in azotic matter, and must be treated as such.—[*Le Textile*.]

Jute Dyeing.

SCARLET.

For 10 pounds. Warm mordant bath for one hour with half pound tannin. Wring and enter in bath of phosphine, or orange aniline; and in a second bath of safranine at 50°. Phosphine can be replaced by any other red coloring.

YELLOW.

For 10 pounds. Bleach and enter in a cold bath of 100 grammes of acetate of lead; give several turns, wring and pass through bath with 100 grammes bichromate of potash until the desired shade is reached. For a deep yellow, increase the dose of salt of lead and of bichromate, and to make it reddish pass in a fuschine bath.

PRUSSIAN GREEN.

For 10 pounds. Boiling bath with one pound of quercitron and one pound alum; let the fibre soak in for one hour, wring and pass in the two following baths:

1st—1 pound nitrate of iron.

 $\frac{1}{2}$ pound salt of tin.

2d—1 pound yellow prussiate.

Pass through bath No. 1, wring and enter in bath No. 2. Give five turns, raise and add 250 grammes sulphuric acid. Raise, wring, and done.

LUMINOUS GREEN.

For 10 pounds. Boil in Sumac bath of 250 grammes, for 3 hours; raise, wring and enter in a methyle green bath. For yellow tinge, add some picric acid.

BROWN.

For 10 pounds. Boil 2 pounds cutch and add 100 grammes sulphate of copper. Boil for 3 hours; wring, and enter in a boiling bath of 250 grammes bichromate of potash. Rinse and enliven in a fresh bath of 5 grammes Bismarck, 15 grammes alum, and 500 gr. logwood.

CHERRY BROWN.

For 10 pounds. Boil in bath of 2 pounds Sumac, give a few turns, take out and wring; then pass in bath of 50 grammes salt of tin and wring. Enter for one hour in a cold bath made of 2 pounds logwood, 1 pound fuschine and 100 grammes alum. Then raise and add to the bath 80 grammes chromate of potash. Give 7 or 8 turns, rinse and dry.—[*Teinturier Pratique*.]

TEXTILE COLORIST.

Dr. M. FRANK, Manager.

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TEXTILE COLORIST, 506 Arch Street, Philadelphia.

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NO SUBSCRIPTIONS RECEIVED FOR LESS THAN ONE YEAR.

Now that the fiat of the people has gone forth, and the subject of "Protection" is no longer one for discussion, at least for the next four years, all parties will settle down to the conclusion that

"Whatever is—is best."

And now that our contemporaries on the other side of the Atlantic see that there is no longer any use in trying to dissuade us from having our own way; and that we are positive beyond persuasion, and determined to hold to that course which is evidently the most beneficial to us as a nation, there is nothing remains for them, as friends deeply interested in our welfare rather than in their own, than to bow to the inevitable, and make the most of it.

We grieve that the sacrificing selfishness of the Cobden Club should meet with such a thorough rebuff,—but it must be borne in mind that we are young, and of course foolish, and no doubt, will some time, in the dim and distant future, see the error of our ways and improve. Just at present we are tickled with prosperity and apt to impute it to the policy we have adopted of looking out for our own interest by adhering to "Protection."

Let us now offer the right hand of fellowship to our cousins abroad and beg them to accept our best wishes for their welfare; and although we hold to our home manufactures, such as they are, we trust we will nevertheless have the means to purchase of them those things we cannot make ourselves with like excellence; tariff being no barrier to the accomplishment of our desires. Having the means of feeding and clothing our own people, then we can afford to go to France and England for the *electra*. So that really the prospect is good for trade all around.

WHILST the chemists are hard at work in their laboratories, and the dyers are experimenting in their vats, it is not to be doubted that there are novelties, aye and exquisite novelties, lurking about awaiting the anxious hand of the discoverer to bring them to light for the satisfaction of the world and the profit and fame of the lucky manipulator. The beautiful art of the dyer has a boundless field to roam over, and nature lends him every aid in his investigations; where, then, is the man who can say we have colors enough—let us be satisfied? It is impossible that such a stultified being can

exist—at least amongst those who follow the coloristic art: for, we have but to look back in the history of dyes and trace their progress from the very few in use by the ancients to the number and excellence of those of the present day and who shall say what more remains to be brought forth? Certainly it is a good sign of progress in the line of investigation when we find ourselves beset with questions of readers, who are desirous of information on the various topics connected with the mission of our journal, and when we see men who not long ago thought themselves above all instruction, now eagerly seeking fresh information and resolutely studying out new ways and means. It is all very well to dream of perfection, but to attain it is a waking difficulty. There is always a prize awaiting him who reaches the pinnacle, and that prize is the more desirable the greater the number competing for it.

CREDIT DUE.—It is only fair in speaking of combustible silk to state the fact that, in last April, the first to draw attention to the subject was the Philadelphia Fire Insurance Patrol Inspector, Mr. William McDevitt. The first fire was at Messrs. Lipper & Co.'s, Fifth Street, near Race. The second was 309 Arch Street, and the third in the cars of the Reading R. R. Express. This was the one which brought out the investigation by Mr. McDevitt, of which we have spoken in full elsewhere. The credit clearly belongs to this officer, and he should have it, for he has done the community a decided service which should not be slighted.

Something Suggestive.

With a commendable zeal well worthy of imitation on this side of the Atlantic, the Industrial Society of Amiens, in its General Assembly of July 26th, 1880, gave out for competition, for this and the coming year, a series of competitive questions to the operatives and foremen in the several branches of textile manufacturing and dyeing, etc., to be exclusively confined to one of the Departments of France (the Somme). The successful competitors to receive either a gold medal or its value in money. Among other subjects are the following:

A good surface for tissues which shall permit of being advantageously employed on linen. A temple specially applicable to the manufacture of all sorts of cotton velvet. Machinery useful for giving a fine appearance to the warp of tissues.

DR. BAEYER publishes an essay on his discovery of artificial indigo. The object of this publication is to dispel the confusion which could be made between his product, derived from the ortho-tirocinic acid, and the common blue sold for a certain period as artificial indigo, which is derived from cintrio curizone. He claims that his artificial indigo is to natural indigo what alizarine is to madder, and that it will work the same revolution in the tinctorial economy.

THE *Teinturier Pratique* comes out with a new blue called *Modern Indigo*. Though it must be used as the other blue coloring matters, it has no parentage with any of them. Can artificial indigo, yet in its infancy, be already pulled down?

DYEING DEPARTMENT.

THE MONTH'S PRACTICAL RECIPES.

The following practical recipes, like all that will appear in this department, are verified as reliable and warranted to come out satisfactorily, provided the proportions are strictly adhered to, and the manipulation be workmanlike.

DIRECTIONS, NOTES AND COMMENTS.

☞ We have frequently been asked why we give the names of the makers of the aniline and dye stuffs we use when publishing the recipes accompanying our insets. The reason is: We can speak with authority for those we actually test; where anilines and dyestuffs of the same color, manufactured by other firms, may be equally good, but when treated according to our recipe, may not give similar results. In giving the name of certain manufacturers, therefore, we would not be thought partial to them. Each has his own mode of producing desired effects with his own dye stuffs.

Recipe No. 147.

ROSE BENGAL ON GERMANTOWN WOOL.

50 lbs. Yarn.

Dissolve 4 lbs. Alum.

3 oz. Rose Bengal B. { Color Works, formerly—
Meister, Lucius & Bruening, Hoechst, A. M.
Lutz & Movius, N. Y., Boston and Phila.

Enter Yarn at 180° F.; turn while raising temperature to boil.

☞ This is a new product of the Color Works, formerly Meister, Lucius & Bruening, and produces some extra brilliant shades of Rose.

Recipe No. 148.

METHYLENE BLUE ON FLANNEL.

100 lbs. Flannel are mordanted with

2½ lbs. Bichromate of Potash and

2 lbs. Tartar.

Let Boil for 1½ hours, and dye in a fresh bath of

1 lb. Methylene Blue, 000 Pat. { Badische Aniline and Soda Fabrik.
Wm. Piekhardt & Kuttroff,
New York, Boston and Phila.

Let boil for 1-hour.

Methylene Blue, Pat. stands scouring and fulling, and does not require any acid.

Recipe No. 149.

DARK GREEN ON FLANNEL.

100 lbs. Flannel are mordanted the same as in Recipe No. 148 and dyed in a fresh bath of

1½ lbs. Methylene Blue, 0 Pat. { Badische Aniline and Soda Fabrik.
Wm. Piekhardt & Kuttroff,
New York, Boston and Phila.

1½ lbs. Extract of Logwood, { Gifford, Sherman & Innis, N. Y.
1½ lbs. Extract of Fustic, { Poughkeepsie Dye Wood Works.

Let boil for ½-hour.

Recipe No. 150.

FAST CARDINAL ON WOOL.

100 lbs. loose Wool.

Dissolve 1½ lbs. Orange, No. 23, { F. Bredt & Co.,
5 oz. Acid. Fuchsin. { New York and Phila.

13 lbs. Glaubersalt.

¼ gal. Sulphuric Acid.

Enter Wool, and boil to shade.

☞ Lighter yellow or blue shades are easily obtained by changing the quantities of Orange and Acid Fuchsin.

Recipe No. 151.

SILVER GRAY ON COTTON.

100 lbs. Yarn.

Dissolve 10 lbs. Alum.

4 ozs. Nigrosine, { Actien Gesellschaft, Berlin.
Henry A. Gould,
New York, Boston and Phila.

Enter yarn at 120° F. Turn continually while raising temperature to shade.

☞ This is a special shade of Nigrosine and very desirable.

Recipe No. 152.

SAFFRANINE ON COTTON.

50 lbs. Yarn.

Put down over night in

18 lbs. Sumac.

Next morning wring, and enter bath of Oxy-Muriate of Antimony 2° T.; give three to 4 turns and let it remain in the bath for ½ to 1 hours, wash thoroughly and enter dye bath of

1 lb. Saffranine, { Actien Gesellschaft, Berlin.
Henry A. Gould,
Boston, New York and Phila.

At 60° F. turn rapidly, while raising temperature to 110° F. Be careful not to exceed this temperature.

Recipe No. 153.

SCARLET ON COTTON.

50 lbs. Yarn.

Put down over night in

18 lbs. Sumac.

Next morning wring, and enter bath of Oxy-Muriate of Antimony 2° T. Give three to 4 turns and let it remain in the bath for ½ to 1 hours, wash thoroughly and enter dye bath of

10 oz. Saffranine, { Actien Gesellschaft, Berlin.
Henry A. Gould,
Boston, New York and Phila.

At 60° F.

Turn rapidly, while raising temperature to 110° F. Be careful not to exceed this temperature.

Recipe No. 54.

DARK NAVY BLUE ON WORSTED.

50 lbs. Yarn.

Dissolve 10 lbs. Glaubersalt,

2 lbs. Induline, { F. Bredt & Co.,
2 lbs. Arelil Extract, { New York and Phila.
6 lbs. Indigo Extract,

(Continued on page 251.)



PRICES CURRENT.

PHILADELPHIA, NOVEMBER, 1880.

DYES AND DYE-STUFFS.

Acetic Acid.....	lb. \$	6	65	8
Albumein, Blood.....	50	60		
Albumein, Egg.....	85	95		
Alum.....	2	124		
Alum, lump.....	30	40		
Anatto, prime.....	1	30	1	50
Annattoine.....	26	30		
Aniline Oil, English.....	28	36		
Aniline Oil, French.....	22	30		
Aniline Salt, cake.....	22	30		
Aniline Salt, cake.....	16	25		
Archil Liquid, best.....	7	10		
Argols, crude (Opport.).....	16	20		
Argols, refined St. Ant. Brown.....	28	32		
Argols, refined Gray.....	30	33		
Argols, refined Light.....	32	35		
Aqua Ammonia.....	6	8		
Aqua Ammonia, F. F. F. F.....	75	90		
Aurine.....	5	64		
Barbary Root.....	5	64		
Barwood.....	13	14		
Bi-Chromate Potash.....	21	3		
Bleaching Powder.....	10	13		
Borax, refined.....	24	5		
Brazil Wood.....	7	7		
Blue Vitriol.....	34	34		
Bristanotte, roll.....	8	12		
Carmwood, pure.....	8	10		
Carwood, No. 1.....	4	64		
Carbolic Acid.....	24	20	25	00
Castic Soda, 60 per cent.....	65	70		
Castic Soda, 70 per cent and over.....	55	60		
Cochineal, Honduras.....	36	38		
Cochineal, Mexican.....	13	14		
Cochineal, Black Teneriffe.....	20	28		
Coppers.....	15	16		
Cream Tartar, crystals.....	28	28		
Cream Tartar, powdered.....	24	24		
Crimson Spirits.....	50	60		
Cudbear, pure.....	14	20		
Cudbear, No. 1, French.....	19	24		
Cudbear, No. 1, French.....	16	25		
Cutch.....	7	9		
Devil IDV.....	25	30		
Dipping Acid.....	14	20		
Extract Fustic.....	19	24		
Extract Hyperic.....	16	25		
Extract Indigo.....	7	9		
Extract Logwood, bulk.....	25	30		
Extract Quercitron.....	14	20		
Fiavine.....	14	20		
Fustic, Cuba.....	14	20		
Fustic, Maracalla.....	13	21		
Fustic, Savilla.....	6	7		
Gambur, bulk.....	11	2		
Glauber's.....	6	7		
Green Ebony.....	31	4		
Hyperic.....	6	10		
Irish Moss.....	12	15		
Iron Nitrate.....	145	185		
Indigo, Auxiliary.....	95	110		
Indigo, Caracass, fine.....	135	160		
Indigo, Guatemala, fine.....	95	105		
Indigo, Madras, fine.....	18	22		
Indigo, Manila.....	10	16		
Lac Dye, fine powdered.....	34	41		
Lac Dye, good powdered.....	2	21		
Lima Wood.....	24	24		
Logwood, Campeche.....	14	11		
Logwood, Honduras.....	11	11		
Logwood, Laguna.....	7	84		
Logwood, St. Domingo.....	2	21		
Madder, Dutch.....	2	21		
Madder, French.....	2	21		
Maple Bark.....	2	21		

Myrabolans.....	lb. \$	5	6
Muriatic Acid.....	11	24	
Muriate Tin.....	19	22	
Muriate Tin, strong.....	19	20	
Muriate Tin, oxy.....	21	22	
Muriate Tin, crystals.....	21	3	
Nicowood.....	114	124	
Nitrate Iron, pure.....	7	7	
Nitric Acid, (Aqua Fortis).....	26	28	
Nutgalls, Aleppo.....	10	11	
Orehille, waste.....	4	7	
Oxalic Acid.....	20	28	
Pearl Ashes.....	46	50	
Persian Berries.....	5	5	
Phoric Acid.....	27	31	
Potashes.....	65	70	
Prussiate Potash, yellow.....	11	2	
Prussiate Potash, red.....	24	24	
Quercitron.....	3	4	
Red Sanders.....	18	20	
Stannate of Soda.....	4	6	
Starch, Corn.....	4	6	
Starch, Potato.....	6	9	
Starch, Wheat.....	24	40	
Safflower.....	7	8	
Safflower extract.....	12	13	
Salt Ammoniac.....	11	2	
Salt Soda.....	24	3	
Sapanwood, ground.....	60	80	
Soluble Blue.....	104	11	
Sugar Lead, brown.....	22	24	
Sugar Lead, white.....	55	60	
Sumac, Sicily, according to grade.....	85	90	
Sumac, Va.....	60	60	
Soda Ash.....	14	24	
Sulphuric Acid.....	55	60	
Tartaric Acid.....	7	8	
Terra Japonica.....	13	25	
Turner's.....	13	25	
Ultramarine.....	30	35	
Verdigris.....	10	12	
Wood.....	10	12	

BUSINESS OPPORTUNITIES.

TO FURNISH BLUE VAT DYES.—WANTED, to learn the practical use of vats, by a dyer. A good bonus will be given for the instruction. Address, N. Y. E. East, Orono, Me., mail called for.

WANTED.—An experienced dyer, to act as a traveling salesman. Good reference required. Address "Salesman," at the office of this paper.

WANTED, by a gentleman, an opening in a fancy weaving concern. Advertiser has a thorough knowledge of designing and weaving all classes of colored cotton goods, such as checks, fancy linings, cotton shirts, etc., and has had for several years the sole management of a weaving shed and dye-house. Address J. Drake, care of C. H. Hastings, Fenshion, near Manchester, England.

J. F. BIRD, AUTHOR OF THE DYER'S HAND BOOK, is prepared to furnish reliable recipes in any branch of dyeing and will be pleasure in matching in any color or shade for special customers, of the new Aniline Colors. See advertisement, page 8.

Address, 32 St. Marks Ave., Brooklyn, N. Y.

As there are other German publications bearing the title of *Fuerber Zeitung*, we think it fair to state that the article in this journal on the application of the Azo Dyes, Orange, Ponceau Bordeaux, etc., written by Dr. E. Allrich, and expressly translated for us, was taken from Dr. M. Reimann's *Fuerber Zeitung*, the well-known Berlin authority in textile coloring matters.

OXYGEN.—The wonderful agency of oxygen, forming as it does a part of the atmosphere, in the making of those varied colors, is something worthy of more than a mere passing thought. Whether in the changes or in the total destruction of color, oxygen largely co-operates either upon the earth or above it. In fact, it constitutes a color in itself by exerting an influence in the effecting of rays, tints and shades; as well as in making itself visible to the observer. But, although it thus acts as a coloring agent, its excessive action may likewise obstruct or wholly negative the manifestation of color in just as great a degree as its total absence, as in the case of indigo.

(Continued from page 250.)

and add $\frac{1}{2}$ gal. Sulphuric Acid.

Enter Yarn at 180° F.; turn continually, while raising temperature to boil, and boil to shade.

By the combination of Induline with Archil and Indigo Extract, a very dark Navy Blue is produced which is very desirable.

Recipe No. 155.

FAST DARK GREEN ON MERTON OR WOOL.

100 lbs. Clean Wool.

Boil for 14 hours in the following mordant:

- 14 lbs. Bichromate of Potash,
- $\frac{3}{4}$ lb. Tin Crystal,
- 8 lbs. Alum,
- 1 pint Sulphuric Acid,

Then enter a fresh bath of

- 15 lbs. Extract of Indigo, } Boston Dye Wood and Chem. Co.
- 2 lbs. Extract of Fustic, } Boston, Mass.
- 4 lbs. Alum.
- 4 lbs. Salt.

and boil until even.

Recipe No. 156.

NIGHT BLUE ON COTTON.

50 lbs. Yarn.

Dissolve 4 lbs. Alum,

4 oz. Tartaric Acid.

2 lbs. Sal Soda,

1 lb. Night Blue, } James Lee & Co., New York.

Enter at 140° F.; give 8 to 9 turns; wring.

This Night Blue works very satisfactorily on Wool, and is treated like a Nicholson Blue.

Recipe No. 157.

LIGHT BLUE ON COTTON.

50 lbs. Yarn.

Dissolve $\frac{7}{8}$ lbs. Glaubersalt,

4 lbs. Alum,

14 oz. Night Blue, } James Lee & Co., New York.

Enter at 120° F., turn continually while raising temperature to 140° F. and turn to shade.

This is a very fine Blue, and especially to be recommended for light shades.

Recipe No. 158.

GOLD BROWN ON WORSTED.

50 lbs. Yarn.

Dissolve 3 lbs. Alum.

1 lb. Tartar,

3 lbs. Sulphuric Acid,

- 12 ozs. Fast Yellow, } Badische Aniline and Soda
- 5 ozs. Orange A, } Fabrik.
- 1 oz. Fast Red R, } Wm. Pickhardt & Kuttroff,
- 4 oz. Indigo Carmine, } N. Y., Boston and Phila.

Enter at 180° F. and run until even.

Recipe No. 159.

DARK FAWN DRAB ON WORSTED.

50 lbs. Yarn.

Boil up 1 lb. Red Tartar,

3 lbs. Alum,

2 lbs. Sulphuric Acid,

2 lbs. Indigo Extract, { A. Poirrier, Paris.

4 ozs. Archil Extract, { Andreykovicz & Dunk, Phila.

2 ozs. Orange Y, { Levinstein, Campbell & Co., New York.

Enter Yarn at 180° F. and give 10 turns, wash and done.

Recipe No. 160.

PHLOXINE ON GERMANTOWN WOOL.

50 lbs. Yarn.

Dissolve 8 oz. Phloxine B.B. { P. Monnet & Co., Geneva.

{ Heller & Merz, New York.

Enter Yarn at 180° F.; give 5 turns while raising temperature to boil. Lift and add

$\frac{1}{4}$ lb. Acetic Acid to the bath.

Re-enter Yarn; give four turns and done.

Recipe No. 161.

EOSINE ON GERMANTOWN WOOL.

50 lbs. Yarn.

Dissolve 6 ozs. Eosine B, { P. Monnet & Co., Geneva.

{ Heller & Merz, New York.

Enter Yarn at 180° F.; give 5 turns while raising temperature to boil, lift and add

$\frac{1}{4}$ lb. Acetic Acid to the bath.

Re-enter Yarn, give 4 turns, and done.

Recipe No. 162.

DARK SAPPHIRE ON WORSTED.

50 lbs. Yarn.

Give a Guernsey Blue bottom, with

6 oz. Guernsey Blue, wash and raise color in

2 lbs. Sulphuric Acid,

Boil up, and add

3 lbs. Glaubersalt,

$\frac{1}{2}$ lb. Tartar,

1 lb. Alum,

3 lbs. Indigo Paste,

14 lbs. Picric Acid,

{ Andreykovicz & Dunk,
Philadelphia.

Enter and turn for $\frac{1}{2}$ hour.

Instead of Picric Acid, any Yellow Aniline may be used, to make the color faster.

Bleaching of Straw.

Dissolve 100 grammes permanganate of potash (crystals) in 5 liters of hot water. Mix this solution in a tub of water until the water is deep red. Enter straw which has previously been softening for several hours in a tepid bath of soda and well rinsed. Agitate in the straw frequently. It will turn deep brown; if not, add some permanganate solutions; leave it in till discoloration of the bath. When the straw is of a drab shade, rinse in cold water and enter in a bath of sulphurous acid. Make it of a sufficient degree to cause odor. The discoloration of the straw takes place within 30 minutes, and generally turns a good white.

NOTES OF THE MONTH.

All communications under this head will meet with due attention, and coloring matters will be fairly tested.

MESSRS. HELLER & MERZ, N. Y., are the sole agents for the United States for P. Monnet & Co.'s Geneva Aniline Colors.

MESSRS. PICKHARDT & KUTTROFF, N. Y., have a substitute for Archil in Fast Red B. B. Patented. It is claimed to be perfectly fast.

We have received samples from A. Poirrier, Paris, of Acid Green, 1 to 4 B. Our laboratory tests on Cotton and Wool show that they are for the purpose of producing Gen d'Arme Blue and Peacock Green. They are fast colors.

We saw a handsome lot of samples dyed with Messrs. F. Bredt & Co.'s, N. Y., Aniline Colors for the hosiery trade.

We have made several trials of Castiline manufactured by Messrs. C. Tiers Myers & Co., Philadelphia, and found it a valuable acquisition to dyeing. It softens the cotton, develops the color, without any additional labor in dyeing, and is beginning to gain great favor amongst dyers, who are realizing its value.

MR. A. KLIPSTEIN, N. Y., sent us samples of Messrs. Bindsheller & Bush, Basel Erythrosine B. and Y. R. Also, Acid Green B. B. I. We will produce samples ere long.

MESSRS. MAAS & WALDSTEIN, N. Y., are the sole agents in the United States for Max Singer's Tournaï Belgium Aniline Colors.

MESSRS. READ HOLLIDAY & SONS', N. Y., Aniline Colors are drawing the attention of the trade regarding price and quality.

MESSRS. SEHLBACH & CO., N. Y.—Fast Blue on cotton is filling a want amongst dyers.

MESSRS. JAMES LEE & CO., N. Y.—Night Blue, of which we produce samples in this month's practical department, dyes wool as well as cotton, and produces brilliant shades.

MESSRS. LEVINSTEIN, CAMPBELL & CO., N. Y., are not able to fill their orders for Safranine, the demand is so great.

MESSRS. FISCHER & KELLER.—Rose d'Alps is meeting with favor amongst cotton and silk dyers, as it produces very delicate and desirable shades.

We had occasion to try several samples of Dye Woods from Messrs. Gifford, Sherman & Innis, N. Y., Poughkeepsie Dye Wood Works, and found them of standard quality.

LEEDS MFG. CO., N. Y.—Aniline Mordant is an article of standard quality, and is extensively used amongst piece and cotton dyers.

MR. PAUL M. SWAIN, Boston, has sent us a sample of Griggs' Bismark Brown Yellow, which we will test and produce samples soon in our practical department.

DILLER & SEAL, Columbia Dye Works, Philadelphia, are very busy dyeing fancy shades on fine Worsted and Germantown Wool. They will be compelled to enlarge their works.

HENRY BANNISTER, at Sixteenth and Stevens Streets, Camden,

N. J., is now in full operation and very busy dyeing Cotton Dress Goods, Cotton Worsted, etc.

MR. F. J. BIRD, Brooklyn, N. Y., is manufacturing a bottom for navy blue on cotton, claimed to be fast to soap; it is afterwards topped with Anilines. By the use of this navy blue bottom, desirable shades of blue, green and brown can be produced. We have received a sample of Bird's London Blue, which we will sample soon.

OUR TABLE.

The Philadelphia Shipping News and Maritime Advertiser is the title of a weekly journal now before us, and, to sum up its merits, we must say that its contents fully carry out the claim to public favor which its title leads us to expect. Vessels of every class, outward bound, homeward bound, or in port, are most explicitly chronicled, and it would seem that not a jot of shipping news is overlooked. And that is not all—for the decisions in admiralty are fully reported, and every desirable item of information which can at all concern the ship-owner, the consignee, the broker, the captain, and all engaged in sea affairs, is very carefully collated and commented on. He who guides this intelligent craft is a practical hand, A. WATSON ATWOOD. Long may he float his flag over every sea, and even beggared of our shipping, may we long have the *Shipping News*.

QUERIES AND REPLIES.

Under this head we invite all our friends to make their inquiries on every subject connected with dyeing, etc., and we will endeavor to give them such information in answer as they are in need of. We also invite others to give us the aid of their experience in such replies. All will be welcome.

QUERIES.

89.—SIR: I am manufacturing and dyeing black worsted cotton, as sample, according to following recipe:

4 pieces—100 lbs.
4 ends in boiling water.
6 " 7 lbs. Cutch.
6 " 2½ " Bluestone.

One hour in 2 lbs. chrome, 1½ hour in 30 lbs. extract of logwood and 3 lbs. ext. Fustic. Wash off.

Now, can you give me any particulars in regard of the dye taking uneven, and spotted in some places, and glazed by the smallest friction. Your kindly information will oblige.

HABNAB.

P. S.—Please let me know if my recipe is wrong, and where?

90.—What is the best method for extracting the sulphur from goods after bleaching? D. B.

91.—Will you please state the value of a litre? R.

92.—What is a good solvent for Aniline Salt? ROGAMUS.

93.—Is there any mode of preventing the starch from starched goods adhering to drying cylinders? R. B.

ANSWERS.

89.—If the writer "Habnab" will send us his name, and he proves to be a subscriber to this paper, we will inform him as to his being altogether wrong in his recipe, and distinctly show him that he knows nothing of dyeing black worsted cotton. In fact the process he gives differs so completely from the sample sent us, as to show clearly the latter was never dyed by it, but by some really practical man.

90.—Place the goods in pure cold water for 2 hours, or more, and then sulphur will disappear.

91.—A litre equals one quart of water, and weighs 35 ounces.

92.—If you try chlorozone as a solvent on aniline salt (a small quantity of liquor on the salt liquifies it rapidly), you will find some good points for black dyeing and printing. Moist steam applied on the black cloth will show what can be effected.

93.—This question was put to us before, and we have made diligent inquiry, but find only that others are in the same predicament, as there appears at present no remedy for the adherence of starch, or other sizing, to the drying cylinders.

Foreign Notes.

It is said that the projected establishment of a silk conditioning control in New York is under way, and is well patronized by silk dealers and manufacturers. The imported silk, in bales from Europe, are accompanied by a conditional document proving the grades and character of the silk, but those from China and Japan are not so controlled, and require the above verification to circulate in the trade.

Another prosecution, of a more general character, has just ended in Paris, with a decision of the Tribunal of Commerce in favor of a buyer prosecuted for the payment of spurious blue, bought on samples bearing a good appearance, but being in reality a deceptive article as to yield and quality. The seller was defeated, being unable to disprove the fact of the inferiority of the coloring matter sold as being good, &c.

The Mulhausen Print Works use chlorozone for bleaching entire and printing bandana styles. Nobody is admitted to see the process. Chlorozone is also used for softening hard waters. A small quantity on a large volume of water is sufficient to precipitate the carbonaceous matters and absorb the acidity of sulphates of lime and other minerals in solution. The water so treated acquires the characteristics of rain-water. One gallon of chlorozone is sufficient to soften several thousand gallons of hard-water.

Messrs. Shrader & Dunecke have applied for letters patent on processes for bleaching amber, lac, copal, and other gums, by ozone, and also for the desiccation of linseed oil by the same agent.

Messrs. Mather & Sachs have patented a process for treating cotton, silk, linen, hemp, jute and Ramie, preparatory to bleaching, dyeing, and printing of the fabric.

Messrs. Leviander & Larne, of Lille, have obtained letters patent for dyeing various colors, in the Chinese style, on wool or cotton slivers, or corded ribbons of either staple.

M. Allivans, Marseilles, has a patent for treating Bohemians and other fibrous products.

GENEVA TINCTORIA.—This common plant, known in France and in England under the name of Gonet, and which produced the royal surname of Plantagenet, has for a long period been used as a coloring matter. It produced a yellow color similar to isatine, and was used as gaude on animal or vegetable fabrics. The town of Kendall, Westmoreland, had once the specialty and the lead of this tinctorial product. But other and superior materials superseded this primitive article of commerce. The plant, however, maintained its usefulness in other avocations. It has been found excellent as a filamentous stock, and is now extensively used in the South of France for the textile it contains, and which is extracted by rotting, beating, and scutching, as hemp, flax, &c. Though not a first-class staple, the genet fibre has enough value to be an industrial element of importance in some localities of Europe.

GRAWITZ AND BLONDEAU.

Mr. Grawitz, the inventor of black aniline, and M. Blondeau, editor of the *Moniteur de la Teinture*, have had their quarrel ended by the Tribunal of Commerce, Paris. Grawitz having sued M. Blondeau and an anonymous correspondent of the *Moniteur* on account of published articles contesting the value of the Grawitz process and patents, the tribunal decided against the anonymous correspondent and exonerated M. Blondeau, the editor of the *Moniteur*. But he had to divulge, by order of the court, the name and status of his correspondent, who is a M. Schultz, a contributor to the publication. M. Schultz had to bear the brunt of the battle; he was condemned to pay 10,000 francs damage to Grawitz for having libeled and defamed his aniline products, &c., all the cost and expenses of the suit added. M. Schultz will find his penalty amounting to 3,000 dollars. A rather costly literary sport!

EXTRACTS FROM FOREIGN EXCHANGES.

Composition of Iron for Dyeing.

The various iron compositions sold and used for dyeing blacks and blues, are generally so different and irregular in their properties, that dyers are frequently obliged to prepare themselves the compositions. The following recipes give very good results and may prove useful to many of our readers:

Have a large earthen vessel. Place in it 5 litres water, 3 kilos nitric acid (yellow) at 30° and one kilo Chlorhydric acid. Add to this mixture 161 kilos sulphate of iron in small portions. This will generate abundant nitrous vapor. When the cold liquid is not sufficient to dissolve this salt, apply a proper degree of heat to effect the dissolution. When this is done transfer the whole mixture, yellow residue and all, in a cast-iron boiler. Raise to boiling rapidly and pour the solution in a large barrel to be cooled and settled.

The solution so obtained is clear and of a beautiful brownish red, marking 50° B. The yellow residue, consisting of subsulphate ferric is used for the preparation of English red. The clear solution often turns into a yellow mash, but when heated to 100° it recovers its limpidity. This indicates a good amalgamation and that the mordant has no excess of acids nor of iron salts.

The mordant known as *Nitrate of iron pure*, is prepared by the action of a mixture of two parts of yellow nitric acid 30° B. and of one part of water with iron shavings gradually put in this acid bath with due precautions to avoid excess of temperature by the reaction of the contact between the acid and the metal. An excess of iron in this liquid produces a concentration of 38 to 40 B.

PYROLIGNITE OF IRON.

The distillation of wood being not constant nor practiced for the dyeing trade, the pyrolignous acid furnished by this industry, gives but a black bath which contains no salt of iron in sufficient nor regular quantity, and whatever it contains is not free from sulphate. This defect has an important bearing on the delicate and important violet prints on cotton. The mordant being feebly oxidized, the violet it furnishes is imperfect and dull. The tarry matters of the black pyrolignite are an obstacle to oxidation even from the air, since the slimy scum prevents its access into the body of the liquor. The remedy to this shortcoming for a fine violet is in a combination with artificial alizarine with an intermediary between the protoxide and the oxide of iron. This intermediary is the acetate of iron which acts safely as a ferruginous mordant in this case.—*Polytechnic Journal*.

European Bleaching.

M. Pontiggia publishes a long essay on his bleaching process which he summarizes as follows:

1st. The brown cotton, sewed together is passed to the singeing operation and wetted in hot water in a large vat.

2d. Subjected to a first boiling in caustified soda, then to a thorough washing to remove the lime soda.

3d. Subjected to second boiling in carbonate of soda, then rinse thoroughly, to remove the alkali.

4th. To a third boiling in resinous soap solution, then rinse thoroughly, to remove the soap.

5th. To an immersion of chloride of lime for four or six hours, then washed thoroughly, to remove the chloride of lime.

6th. To four hours immersion in sulphuric souring then washed thoroughly in hot water to remove the acid. If the bleach is not sufficient the fabric is spread on the grass for forty-eight hours.

Without this casual requirement, the whole procedure takes two full days for cotton tissues, independent of the drying process.

For linen and damasked goods the method of M. Pontiggia requires two full working days inside, and forty-eight hours exposure on the grass outside.

There is no danger of reproduction in America for this tedious and expensive arrangement, the inventor may rest assured.

Preservation of Sizing Matters.

BY M. BLONDEAU.

The various gummy matters used for sizing and finishing cloth or any fabrics, are generally subjected to putrid decomposition. The complete preservation of these useful ingredients can be effected by the addition of one gramme of Salicylic acid for each kilo of the preparation in making it.

The melting and trituration of this glutinous ingredient must be made by steam in wooden vessels, because metal would oxidize and produce a reddish tinge under the action of the Salicylic acid.

The colors prepared with albumen, which can scarcely be kept fresh in summer, are well preserved by 1 gramme per kilo of this acid. The fabrics also gain from the use of unputrid size.

Blue Dyeing Without Indigo.

A patented process, by Marcellin, claims a fast blue, similar to royal blue, without the expensive use of indigo, and with an equal result as to quality and solidity.

The patentee says:—"My discovery and patent have for their object to suppress the unavailable use of various dye extracts with the aniline red-blue in connection with crystal-soda or alcohol as mordants, which are generally imperfect and unresisting; also to dispense with indigo, which is too heavy.

I have succeeded in producing this result by the employment of aniline red-blue with certain mordants. This dye resists alkali and acid, as well as the action of air and temperature.

The process is as follows:

For 100 kilos of white wool, or fabrics, I make a bath containing:

Sulphate of Copper.....	5 kilos.
Sulphate of Iron.....	6 kilos.
Soda.....	10 kilos.
Bichromate of Potash.....	5 kilos.
Extract of Logwood.....	5 kilos.
Extract of Cuba.....	5 kilos.

When all these ingredients are dissolved in the boiler, a solution of nut-gall is added, in proportion with the tint required. This helps forming the color, and prevents the logwood reddening, through the action of acids, or from greying, by the influence of alkalies.

When the bath has reached the proper heat, a solution of one or two kilos of blue-red, aniline in hot water is added, to complete the dyeing liquor. The wool is immersed at 80°, raised rapidly to boiling, and so maintained for several hours.

The deep, light, or medium shades, are obtained by the increase or diminution of the substances above named, the given proportions of which are for a deep blue.

The proportion of the aniline blue may also differ from that of the other substances. For a sharp blue, the quantity of this coloring matter can be increased. For a light blue it can be reduced, so as to regulate the shade at will. The dyeing is satisfactory, the bath is left to cool off, and then the wool is thoroughly washed in plenty of water. This process not only costs half the judigo process, but saves considerable time. It can produce 250

for the weight of the bottle (previously ascertained), and the net weight will be an approximate of the specific gravity of the sample. Between the lighter (good) and the heavier (bad) there is a variance of fully 40 per cent.

The test of indigo may also be supplemented by the following color test: A portion of the above mentioned test powder, say 5 grains, put in a two-ounce flask (which must be perfectly dry). To this is added an equal bulk of quartz sand, previously digested in *aqua regia*, well washed in plenty of pure water, and made perfectly dry. Upon each pour 4 fluid drachms of the strongest sulphuric acid; stopper the flasks, and let them stand 24 hours at about 80°F. Pour the contents of each flask into a quart or litre measuring glass; rinse out the flask with clean water as long as any color remains; pour the rinsings into the measure, and fill up with water to a fixed mark. Stir till the blue solution is of an equal strength throughout. Take 2 fluid drachms of this liquid and pour them into a 2-oz. phial, of clear, white glass; fill up with water; mix perfectly by closing the bottle with the finger and inverting it two or three times. Then place it in a northerly light. The other samples are similarly treated, and then compared for depth and purity of color.

Extract of Indigo is indigo blue in a pure state, rendered soluble by means of the strongest oil of vitriol, or, better, of fuming sulphuric acid. A portion of the acid is afterwards, in most cases, neutralized and removed.

The ordinary paste extract should form a tolerably consistent, semi-fluid mass, of a purple color, without any greenish reflection.

Red Extract of Indigo is also called *Purpuric Acid*. But the name (Red Extract of Indigo) is also given to a very different article, obtained by the action of concentrated solutions of caustic alkali upon indigo carmine. The exact nature of the process, and the circumstances upon which its success depends, are not well understood. The color produces dyes upon wool fibres, flesh colors, various reds, and a kind of purple. All these shades are very fast, resisting all re-agents which do not destroy the fibre itself. However, they are dull, meagre and expensive, and not in use.

Refined Indigo is an article which claims to be indigo-blue or indigotine freed, or nearly so, from the impurities, mineral or organic, always to be found in crude indigo. The tests are that it does not effervesce under the influence of acids. If a small quantity be digested in hydrochloric acid, and another in a strong solution of carbonate of soda, neither should color the liquid green, yellow or brown. If burned to ashes a mere trace of mineral matter should remain. Refined indigo is used for producing the finest quality of chemic blue.

The wide distinction between *Prussian Blue* and *Indigo* must be very apparent; the former being of comparatively little use in dyeing, whilst indigo is of great value in many respects, as we have seen; and we have gone thus far into the subject for the information of those who expressed a desire for fuller knowledge on it than they possessed.

We will pay SEVENTY-FIVE cents a copy for our first number, January, 1879.

(Expressly translated from the *Färber Zeitung*, for the TEXTILE COLORIST.)

Turkey Red Dyeing on Cotton with Alizarine, in a Small Dye House.

FOR 10 KILOS YARN.

10 kilos yarn are boiled out with 1 kilo Crystal Soda for 1 to 1½ hours, and after thorough rinsing and soaking in soft water are dried or not. If it has been dried, which manipulation is the better way, then make a mordant of 2 kil. Turkey Red Oil in 20 litres soft 30° R. warm water. If the yarn is not dried, 3 to 4 kilos Turkey Red Oil to 18 or 19 litres water is required. From this mordant take about 8 litres in a clean vessel and turn 1 kilo of yarn for five minutes; wring, add again 1 litre of mordant, and manipulate the second kilo of yarn—and so on, with the addition of a litre each time, until the whole yarn is mordanted. After the yarn has laid for one-half to one hour, you begin again with the last mordanted yarn first, and repeat the operation by the addition of ½ litre to every kilo yarn until the whole is mordanted, wrung out and straightened. The next is the drying (small dye houses have rarely a drying-room containing 30 to 40° R., which is the most desirable,) in the air, requiring often turning to gain evenness in drying and color. After thorough drying, you proceed to mordanting the yarn with Acetate of Alumina, 6° B., free from iron. As the manufacture of Acetate of Alumina occupies some time, and is used for many purposes in a dye-house, it is advisable to make rather large quantities, so as to have it ready, in the following way: A kettle is filled with 20 litres of water; add 100 to 200 grams feathered tin, then bring to boil. 10 kilos Alum are dissolved therein; boil for at least 15 minutes, while you add 20 to 25 grams Yellow Prussiate of Potash (the boiling is necessary to divide that in overplus used Prussiate), then placed in a white pine wood vessel, or a stone pot, and kept. After some time you add a solution made of 1 kilo Crystal Soda in 2 litres boiling water to it while stirring, and finally, after the Alum solution has cooled off to 35 or 40° R., you add a solution of 7½ kilos Sugar of Lead in 8 litres of hot water. You let the whole rest now, until all created Berlin Blue, also Sulphate of Lead, has settled. The best way is to wait twenty-four hours, then draw off the clear liquor; add to the sediment more clean 40° R. warm water. This second liquor, when cleared, can be mixed with the first, and then prepare a bath of 6°-8°. The yarns already mordanted with oil, and thoroughly dried, are entered in this bath for twelve hours, occasionally turned, taken out are well wrung and shaken, so that the thread lay singly. Up to the present, after every other operation, the wringing was necessary, but from now on a mere draining or whizzing after every operation will be required; then by the operation of wringing, certain threads would receive light and dark spots in the dyeing.

Now prepare a spacious bath of 30° R. warm water, to which add the previously well dissolved 2½ kilos chalk, place yarn on sticks and enter bath, turning continually for twenty minutes, then take out; leave drain (no wringing), and rinse until there is no more appearance of milky water; leave it to drain or whizz it; now proceed to dyeing: Prepare a spacious bath of soft cold water; stir in 1,200 grams 11° Alizarine; also, 500 grams Turkey Red Oil, previously diluted with a small quantity of warm water; now

enter yarn cold and turn rapidly for half an hour; now put on steam and dye under continuous turning, so that the bath, within one and a half hour, reaches the boiling point. Let boil for about fifteen minutes (longer is useless), lift out, drain and rinse well. The soaping which is now required is carried out as follows: 750 to 1,000 grams Marseilles Soap are dissolved and entered in a bath at 50° R., the yarn entered, continually turned while raising temperature to 60° R., and turn at that temperature for half an hour, lightly rinse and dry. Now follows the steaming. In case you have no steam chest, steam the yarn on the cylinder, place the skeins on a piece of shirting, roll them loosely and tie them fast on top and bottom; steam for one-half to three-quarters of an hour by one-third to one-half atmospheric pressure. Should the red be desired to be a more yellowish shade than the Alizarine would produce, add to the soap bath 30 to 80 grams, with half as much Soda, boiled and cleaned Annatto.

With regard to the water, it must be observed that it contains no lime, and is to be especially recommended to the oil, dye and soap bath to use rain or condensed water.

The oil and Acetate of Alumina mordants are kept continuously for future lots, when the baths are strengthened with the required addition.

OBSERVATIONS.

It is well known that a truly brilliant and fast Turkey Red, according to the old or most approved method, can only be produced by absolute cleanliness of material, water and vessels.

The water must be free from lime, especially in the soap bath. Should it get milky, the water contains lime. It is advisable to purify it a few days before by boiling it with a very small quantity of soda or borax, if pure rain or distilled water cannot be procured. Should the water contain iron, it is entirely useless. By the preparing of the Acetate of Alumina, after the addition of yellow Prussiate of Potash, it is more advisable to boil a longer than a shorter time. The Acetate of Alumina should not be used until every blue tint in the liquid has disappeared; it may require sometimes four to five days ere it reaches that point.

Should the Alum contain much iron, and by the addition of the Prussiate turn very blue, it is advantageous to 10 kilos Alum to use only 1 kilo of Crystal Soda.

Use Acetate of Alumina at 30° R. The dyeing should be carried out slowly. Turn for at least half an hour, or longer, in the cold bath ere you put on at steam.

The Alizarine and Turkey Red Oil, manufactured by the Badische Aniline and Soda Fabrik of Stuttgart, has given the most satisfactory results.

Regarding the soap, there is in the market a Marseilles soap, which has a green cast inside, which is, by accident or intention, mixed with a copper oxide. It is advisable to dissolve this soap several days before using, and leave it to settle. It clears by this method, and the copper oxide can be removed and the soap used.

The pressure put on in steaming, of $\frac{1}{2}$ to 1 atmosphere, is the least by which a fast and handsome Turkey Red can be produced, but it is advantageous, if convenient, to use 1 to 2 atmospheric pressure.

Whoever by the observation of this formula and the notes is not able to produce a satisfactory result, can only find fault with himself for not having carried out these instructions; but those who will follow them will always have a satisfactory result.

L. G. in Z.

Dyeing in Lyons, Department of the Rhone.

The report of the United States consul at Lyons gives an interesting account of the trade and commerce of this great textile department of France, from which we extract the following for the benefit of our readers:

"There are eighty dyeing establishments, employing 6,000 workmen. Among these several are pre-eminent for the perfection of their dyes and the extent of their works. One establishment which I visited employs over 2,000 workmen, and it would be impossible to describe, in the limits of this dispatch, the wonderful combinations of color made use of, the many details of treatment, and the variety of processes to which silk is subjected to arrive at that perfection of tint and durability of color which have made the dyes of Lyons so celebrated. There I witnessed goods sent from every country of the globe to be dyed."

The *Teinturier Pratique* gives us the following list of cities in France in which the dyeing interest is carried on: Rouen, Rottbaix, Lyons, Lille and Paris. Wool is chiefly dyed at Elbeuf, Privas, Reims, and Sedan; silk at Lyons, St. Etienne and Paris. There are 250 dyeing establishments in the vicinity of Paris, 450 scouring houses, 25 leather-dyeing places, besides others. And yet there has been a marked decline in the dyeing industry of France during the last four or five years.

On Aniline Black.

In the October number of our excellent contemporary, the *Chemical Review*, we found the following special translation from *Le Teinturier Pratique*, which is of such interest to the great body of American dyers that we take the liberty of transferring it to our columns. After some prefatory remarks the writer goes into his subject thus:

Of the three substances which concur essentially in the formation of aniline black, namely, salt of aniline, chlorates, and metallic salts, the latter have attracted most attention, in consequence of the especial part which they appear to play.

For blacks developed by exposure to the air, of which we shall here chiefly treat, the metal employed by preference from the origin of the discovery of aniline black has been copper.

The oldest theory put forward to explain the particular part played by this metal is based upon its property of forming two series of salts—the one corresponding to the oxide of copper (cupric oxide), and the other to the sub-oxide (cuprous oxide). It is admitted that, on contact with the muriate of aniline, the salt of copper which is at the highest state of oxidation passes to the lowest, giving up its oxygen to the

aniline, and thus transforming it into aniline black.

The salt of copper which has thus been reduced is restored to the maximum of oxidation by contact with the chlorate, and is thus enabled to recommence the same series of transformations as long as there is aniline to oxidize or chlorate to reduce. I have shown more than ten years ago that this theory, so seductive from its simplicity, is not verified by its consequences. Having studied the action of copper, I have presented a theory of the formation of aniline black, which, as it clashes with the then recognized ideas as above explained, has not been taken into consideration.

Some experiments which I have been led to make recently, justify so fully the conclusions which I drew from my former researches, that the last doubts in this respect are removed; they lead to a theory of the formation of aniline black which is exceedingly simple. However, before describing my experiments, it will be useful to summarize older investigations, so as to fix the state of the question in 1865, the time when the researches appeared to which I have alluded. This seems to me the more necessary, as my experiments, though published in the *Bulletin de la Société Industrielle*, de Mulhouse, appear to be but little known.

The mixture prescribed in 1863 by John Lightfoot for the production of aniline black upon calico contains, as is known, large proportions of soluble salts of copper, the presence of which in printing gives rise to numerous inconveniences. The importance of the result to be obtained gave birth to various procedures intended to remedy this defect.

Besides the capital improvement introduced by M. Louth, who substituted soluble sulphuret of copper for the soluble salts of the same metal (especially the sulphate), there have been proposed mixtures which, in the imaginations of their authors, at least, ought to produce a black without the intervention of copper.

The first process known to me is that of M. Paraf. It consists in adding to a mixture of muriate of aniline and chlorate of potash fluosilicic acid in the object of setting chlorine acid at liberty. According to the author, this acid, as well as the chlorine and the intermediate oxides of chlorine, produce the black by their action on the muriate of aniline. In support of his opinion, M. Paraf cites the following experiment: A neutral solution of chlorate of aniline is prepared by double decomposition between crystalline fluosilicate of aniline and chlorate of potash; this solution may be brought to a boil without decomposition, but on adding a drop or two of muriatic acid, there is immediately produced an abundant black precipitate.

The idea which has served M. Paraf as a guide is correct, in part at least, as will be seen below; but things do not happen as he supposes, and the chlorine acid does not suffice to transform the muriate of aniline into black in the conditions

of practical working. In the development of the black, according to Paraf's process, there intervenes another substance, the function and the presence of which have escaped his notice.

On searching among the products of the decomposition of chloric acid for the cause of the formation of the black, I employed chlorates which I knew to be unstable: neutral chlorate of aniline was used either alone or mixed in different proportions with muriate of aniline, and especially chlorate of ammonia. This latter salt is decomposed spontaneously into water, nitrogen, oxygen, and chlorine; or oxygen compounds of chlorine appeared particularly likely to convert salts of aniline into black without the intervention of copper.

I obtained, in fact, beautiful blacks which had very little injurious action upon the fibre by printing on a mixture of muriate of aniline and chlorate of ammonia.

Having added no salts of copper to the mixture, I came to the conclusion that this metal was not indispensable.

There was, however, in my manner of working a cause of error which I was not very long in discovering.

Having printed the same mixture with the block and the cylinder, I found that in the first case the black was not developed, whilst in the second case, where the color came in contact with the metal of the cylinder, which is copper, the black was very intense.

This experiment, which I extended also to Paraf's black, and which was varied in many manners, enabled me to perceive that the presence of a small quantity of copper is necessary for the development of the black, whether obtained by free chlorine acid or by a chlorate. A good result is produced by taking the equivalent of one part of this metal to 100 parts of aniline.

Struck with the remarkable effects exerted by such small quantities of copper, I studied its function, and perceived at first that the theory recognized at the time was not in harmony with facts. This theory assumes that the oxide of copper is reduced to a salt of the suboxide. The presence of the latter in a mixture can be easily detected, as it possesses the property of absorbing carbonic oxide, and I ascertained by special experiments that the salt of aniline does not interfere with this reaction. Making use of this gas as a reagent, I found that neither at ordinary temperatures, nor at that of the ageing-rooms is there a reciprocal action between peroxide of copper and muriate of aniline; it is only at a boiling heat that a black precipitate is formed and carbonic oxide is absorbed.

In the same manner, on printing on mixtures of salts of the oxide of copper (the highest degree of oxidation), we do not obtain a black which would ensue if it was reduced by the salts of aniline, for it is known that salts of the sub-oxide of copper absorb oxygen from the air. The following experiment convinced me that the salt of copper does not serve as

an intermediate agent between the salt of aniline and the oxidizing medium. I hung up swatches of cloth in glasses containing mixtures of air with ozone, antozone—[! antozone does not exist]—or of chlorine. I obtained a black very quickly, and having made comparative trials with muriate of aniline mixed with a salt of copper, I saw that the black was developed in both cases as if the copper was entirely without action. M. Coquillon on the one hand, and M. Goppelsroeder on the other, have since confirmed this observation by preparing aniline black by the electrolysis of the salts.

By what has gone before it is proved that in the conditions of actual practice there is no action between the alkaline chlorates, and the chloric acid and the salt of aniline.

That in the like manner there is no action between these latter bodies and the metallic salt. It only remained then to study what takes place between the salt of copper and the chlorate.

In this direction I found the solution of the problem.

In order to keep as closely as possible to the conditions of actual work, I saturated the swatches with pure chlorate of ammonia, or even with chlorate containing a little of a salt of copper. After drying I determined the quantity of chlorate contained in a square decimetre of Bunsen's method, with standard solutions of iodine and sulphurous acid.

Having aged the swatches in a moist atmosphere, and at a known temperature, I repeated the analysis and found:

1. That the chlorate of ammonia, whether pure or mixed with copper, is not affected at a temperature of 61° F.
2. That at 95° F. the two are decomposed, but at different rates, so that at the end of an hour the pure chlorate had lost 5.5 per cent., and the chlorate mixed with copper 46 per cent.

From these results the chlorate of ammonia is decomposed more rapidly in presence of a salt of copper.

Pursuing my experiments, I found that this alteration was due to the formation of chlorate of copper, which is destroyed in presence of the cloth at 95° Fahr., and at a higher temperature even when alone. If heated in a flask at 140° F. it gives off yellow or colored gases (chlorine and oxygen compounds of chlorine), and there remains a residue formed of a basic salt. The following experiment shows very plainly its remarkable oxidizing properties: A leaf of paper is steeped in a saturated solution of this chlorate of copper, and dried in a stove heated by steam. Suddenly the paper takes fire with deflagration, whilst if we use chlorate of ammonia or potash the paper remains unconsumed under the same conditions.

In contact with salts of aniline the chlorate of copper is decomposed also more easily than if alone.

If we make mixtures of muriate of aniline and of various

chlorates in one and the same bath, and raise the temperature little by little, we see, about 86° F., a black precipitate begin to form in the glass containing chlorate of copper, whilst the other mixtures are not blackened at the same temperature. All these facts show that the chlorate of copper is the least stable of the chlorates which have here been taken into consideration; that it acts upon the salts of aniline at a lower temperature than the others, and more energetically even than free chloric acid.

My investigations on the part played by copper in the formation of aniline black has led to the conclusions that:—

1. Contrary to the generally received opinion, copper does not act as an oxidizer.
2. We may obtain aniline black without either chlorate or copper, by the action of ozone, antozone (see former note), or chlorine upon the muriate of aniline.

3. In presence of a chlorate, copper (or some analogous metal) is necessary. There is formed chlorate of copper, which, being decomposed at a high temperature, acts upon muriate of aniline more rapidly than the other chlorates.

In my opinion, it is the products of the decomposition of chlorate of copper which must transform the muriate of aniline into black. Nevertheless this consequence has neither been definitely announced nor proved directly in the investigations which I have just explained.

This circumstance has doubtless hindered my views from being more generally adopted.

When recently reflecting on this subject, I have noticed the gap which remains to be experimentally filled up, in order to show that it is the relative instability of the chlorate of copper which is the cause of the formation of aniline black.

The products of the decomposition of this salt being gaseous, I have given the following form to the experiment:

I took four flasks; in the bottom of the first I put a few grammes of dry chlorate of ammonia, the most unstable of all the alkaline chlorates; in the second a mixture of the same salt with a little sulphate of copper; in the third chlorate of copper; and in the last a mixture of chlorate and of salt of vanadium.

I extended this experiment to vanadium because attention has been lately turned to this metal, and because the opportunity has been taken for a restatement of the old theory of two states of oxidation. If this theory, according to M. Guyard, can be applied to vanadium, it cannot to copper, as have already shown, whilst what I have just said of the instability of chlorate of copper is applicable also to vanadium.

I hung up in each flask a swatch which had been saturated with a salt of aniline with an excess of the alkaloid. According to the arrangement adopted, the three last flasks contain all that is needed for developing aniline black; the

different active bodies not being in contact no reaction is produced.

The four flasks were then placed in a water bath so as to immerse only the part containing the chlorates, and the temperature was raised. The black was first developed in the flask containing the vanadinn (about 86° Fahr.), then followed the two flasks containing a salt of copper, whilst the flask containing pure chlorate of ammonia remained inert.

We may fairly conclude from this experiment that the black upon the swatches is developed by the gaseous products emanating from the chlorates under the influence of copper or vanadium.

As a rider to this experiment I prepared aqueous solutions of chlorine, of hypochlorous acid, chlorous acid, and of hypochloric acid.

I poured a few cubic centimetres of each of these solutions into flasks, in which I suspended, as in the former experiment, swatches of cloth saturated with muriate of aniline. The action was very rapid: under the influence of these gases which were diffused in the upper part of the flasks, I saw the black being gradually developed, and I was able to follow the different stages of its formation. The tissue first became of a green color; then the color darkened more and more, and became a blue-black. At this point the highest effects is obtained, both as regards the depth and the solidity of the black. Eight minutes are scarcely needed to obtain this effect. If the action is allowed to continue, the blue-black turns to a violet, reddens more and more, and tends rapidly towards that rusty shade peculiar to aniline blacks which have been treated with a hypochlorite, a well-known phenomenon which has been studied in detail by M. Camille Kœchlin.

Thus all the gaseous bodies springing from the deoxidation of chloric acid, from hypochloric acid to chlorine, are able to transform muriate of aniline into black at the common temperature and without the contact of any metal.

The most beautiful black is formed by chlorous and hypochloric acids; chlorine and hypochlorous acids act too energetically. Hence their action is difficult to control, and the black becomes too violet and even rusty in patches, whilst in other parts it is scarcely formed. By means of these gases the black may be obtained upon wool and silk with the same ease as upon cotton.

The different stages of the development of aniline black which may be observed so easily by the use of the chlorous gases are so important from a practical point of view that we must consider them for a moment. I am thus led to touch upon a question upon which the chemical section of the Industrial Society of Rouen have published numerous and excellent observations, which will find in these lines confirmation, if not a connecting link.

The green substance which is formed in the first place becomes a blue-black, as we have just seen by the regulated action of the chlorous gases which first produce it. It undergoes the same action,

but more rapidly after a short immersion in a weak, watery solution of the same gases. We know, also, that chronic acid and bichromate of potash possess the same property.

Hence it follows that an acid and dehydrogenising medium transforms this substance from a green-black,—the so-called "emeraldine"—into a blue-black, which is the aniline black properly so-called. On the other hand, we know that the same emeraldine may be turned to a blue-black by alkalis.

Do these two blacks, the result of processes so opposite, though alike in their appearance, possess the same properties? Evidently not, for whilst the second is turned green by the feeblest acids, the former, produced in an acid medium, resists. It requires concentrated acids, or reducing agents, like sulphurous acid, to transform this black into emeraldine.

According to a recent communication by M. Zurcher to the Chemical section of the Industrial Society of Mulhouse, emeraldine is in a lower stage of oxidation than aniline black.

The opinion of M. Zurcher, based upon experiments not yet published, receives fresh confirmation from what has gone before.

I will still add that aniline blacks, when they come from the ageing house, are of a very deep greenish blue—the color of a mixture of emeraldine and of aniline black—and they only appear black after passing through an alkaline bath. Steam blacks, on leaving the chest, are of a darker color, and may be considered less rich in emeraldine.

It is known that they are less liable to undergo that annoying change known as "greening."

The simultaneous existence of the two blacks—a mixture of which forms the aniline black of commerce—was already observed in 1872 by M. Brandt. In his memoir our colleague pointed out the advantages which result from the use of chlorate of aniline in place of chlorate of potash, and he describes these two blacks:

The one is very solid, and resists almost all chemical reagents; he considers it as formed by a chlorated derivative of aniline.

The other, the result of the oxidation of the salts of aniline, is much less solid than the former, and turns green by the least acidity, but like the former it resists soap perfectly.

M. Brandt holds that a mixture of the two is needed to give a black of a proper shade.

His descriptions agree well with characters of emeraldine and of true aniline black. If we could succeed in regulating the action of chlorous and hypochlorous acids, gases which are deleterious and in a pure state even explosive, the question of the rapid production of a black fast against acids would be solved.

I conclude that aniline black is produced at common temperatures whenever muriate of aniline is placed in a dehydrogenising medium, such as active oxygen, chlorine, and its oxides lower than chloric acid.

The mixtures employed for aniline black contain a chlorate and the salt of one of the active metals, and are convenient means for generating gradually, and on the spot, the chlorous gases mentioned above—an effect due to the great instability of the chlorates of these metals.

Recipes From Foreign Sources.

Dark Brown on Loose Cotton (stands fulling).—200 lbs. raw cotton are boiled in an old cutch bath, with an addition of 60 lbs. cutch, 6 lbs. alum and 6 lbs. bluestone, for two hours, then taken out, and next day entered in a hot bath containing 5 lbs. bichromate of potash, for 1 hour; again taken out, washed and dyed with 60 lbs. logwood, 12 lbs. fustic extract, 6 lbs. alum, in a hot bath, after 1 hour saddened with 5 lbs. copperas, and left remain in the bath for 1 hour.

Dark Bluegray on Loose Cotton (stands fulling).—300 lbs. raw cotton are boiled for 2 hours with 6 lbs. alum, 2 lbs. bichromate of potash and 4 lbs. bluestone; next day prepare a bath with logwood, previously well-boiled, and dye at hand heat, after 1½ hours saddened with 6½ ozs. copperas and 8 ozs. bluestone, and then left to remain in the bath for 1 hour.—*Deutsche Farber-Zeitung.*

Recipes for Printing.

CHROME BLACK ON COTTON.

1½ litres Logwood Extract.....	20°B.
0.75 litres Quercitron Extract.....	20°B.
0.75 litres Acetic Acid.....	7°B.
18.75 cems. Acetate of Iron.....	12°B.
1½ litre Water.....	
0.375 kilo Wheat Starch.....	
0.750 kilo Wheat Flour.....	

CUTCH BROWN ON COTTON.

1½ litres Water.....	
600 cems. Acetic Acid.....	5°B.
900 grams Cutch.....	
300 grams Sal-Ammoniac.....	

Boiling, then add

200 grams Acetate of Alumina.....	15°B.
1½ kilo Gum, to thicken.....	

STEAM YELLOW ON COTTON.

560 grams Flavine in Paste, and	
2 litres Water are thickened with	
2 litres Gum Water, and	
850 grams Gum Tragacanth Solution.	

Then add

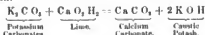
1400 grams Acetate of Alumina.....	8°B. —1b.
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Application of Chemistry to Textile Art and Dyeing.

(Continued from page 245.)

POTASSIUM HYDROXIDE, OR CAUSTIC POTASH, K O H.

If we add carbonate of potash to a sufficient amount of Potash to a sufficient amount of quick lime freshly slacked, carbonate of lime is precipitated, and the supernatant liquid holds in solution caustic potash.



This solution is evaporated to dryness in a silver basin, strongly ignited, and when fused, cast into sticks. In this way a very pure

product may be obtained; the caustic potash of commerce, however, which comes in lumps, is not so carefully prepared, and iron pans are used in place of silver vessels in the final stages of its preparation. The consequence of this is, that it is frequently very impure, and its value must be ascertained by tests, which will be hereafter described.

Caustic potash, in a pure state, is a white substance, dissolving itself in half its weight of water. The solution turns red vegetable colors blue, and destroys and dissolves the skin and the animal tissues, such as silk, wool, hair, etc. It neutralizes the most powerful acids, forming salts with them with the animal and vegetable fats and oils, it forms compounds, known as "soaps;" the potash soaps generally belong to the class of "soft soaps." It also has a marked effect on cotton and cotton fibres, and on nearly all dye-stuffs; it is very largely used in the Arts, but not now to such a large extent as formerly, because soda, which has precisely the same properties and effects, has in these modern days become so much cheaper as to take its place for almost all purposes. Solutions of potash and soda in water are often called lyes. When a solid piece of caustic soda is left exposed to the air, it rapidly attracts moisture and deliquesces; it also attracts carbonic acid, and becomes converted into potassium carbonate. If a potash solution is left uncovered, it is likewise in turn converted into carbonate. If it is desired to prepare a solution of caustic potash from the carbonate, the latter should be dissolved in from ten to twelve parts of water, heated to boiling in an iron kettle, and one part of freshly-slacked lime added. The boiling is continued till a sample of the liquid no longer effervesces on addition of a few drops of acid; the liquid is then allowed to cool, and after settling, the clear solution is drawn off and preserved in a closely covered iron vessel. Vessels of copper, lead, oak, etc., are quite unsuited to the keeping of alkaline solutions; pine wood and iron are the best materials to use in this connection.

POTASSIUM CARBONATE, K₂CO₃.

The ashes of trees and land plants in general contain varying quantities of soluble and insoluble ingredients, the latter predominating. The larger portion of the soluble salts consist in potassium carbonate and also of potassium sulphate and chloride. By lixiviating the ashes and concentrating the liquor in iron vessels till it solidifies on cooling, crude or lump potash is obtained. This product is calcined, in order to remove the water and destroy the organic matter, and is commercially known as pearl ash, or simply as potash. Stone ash is crude ash mixed with caustic potash, obtained by treating the crude potash liquor with caustic lime, and boiling down to dryness. Commercial potash is generally very impure, and sometimes contains as much as 50 per cent. of potassium sulphate and chloride. Pure potassium carbonate may be obtained by the ignition of cream of tartar, or by fusing nitrate of potash with an excess of charcoal. The latter operation requires much care, however, and some familiarity with chemical manipulations. In both cases the residue has to be treated with water to dissolve out the potassium carbonate.

Anhydrous potassium in a state of purity is a white granular powder, which attracts moisture and deliquesces in the air, and is soluble in water, the solution being attended by considerable heat.

We may consider it as a compound of an oxide of potassium with carbonic acid, or, in other words, of a very strong base with a very strong acid. Potassium carbonate, therefore, although not strictly speaking a caustic, has a strong alkali reaction, turning red vegetable colors blue, with a sharp alkaline taste.

(To be continued.)

Practical Instructions for Dyeing Vegetable Ivory Buttons.

R. WERDENBERG.

In order to dye the turned buttons made from vegetable ivory (stone-nut) easily, cheaply, and beautifully, the first step is careful sorting.

The whitest are used for light colors; those that are yellowish or yellow for brown and black.

The nuts, according to their degree of ripeness, may be either white or yellowish, and must, therefore, be accurately sorted in order to get even shades. Before dyeing, they are thoroughly cleansed by boiling in water.

For the mordants acetates are preferred, black liquor, red liquor, verdigris, and sugar of lead. These mordants yield, with woods containing tannin and coloring matters, a great variety of dyes, which may be modified thousand-fold by the addition of small doses of red woods, logwood, fustic, bark, catechu, chestnut, galls, sumac, oak bark, and myrobolans. If the buttons are first mordanted with the above-named acetates, they are readily dyed all possible colors.

Coal Black, (50 Grains.)

Boil up	
Water.....	175 pints.
French Extract of Logwood.....	11 lbs.

Enter the buttons and stir very well in the dye for an hour, at 190° Fahr. Take out and let cool for an hour; enter in black liquor (pyrolignite of iron) at 51° Tw. Stir them for half an hour, and then spread them out to air for two or three hours. They are then entered in

Water.....	44 pints.
Chromate of Potash.....	2 ozs.

and well washed.

Brown.

Dissolve in	
Water.....	17½ pints.
Prepared Catechu.....	5 lbs, 7½ ozs.

Let settle and strain off clear for use.

Take 49 pints of water, add 9 pints of the above catechu liquor, and heat to 100° Fahr.; enter the buttons, and heat to 190° Fahr. for half an hour. Take out, let cool, and steep the buttons for half an hour in

Water.....	49 pints.
Chromate of Potash.....	8½ ozs.

Stir them well in the water for fifteen minutes, take out, and wash well. If a very full brown is required they may be returned to the catechu beck.

For the darkest browns more or less logwood liquor at 51° Tw. may be added.

Many modifications in shade may be effected by steeping in acetates of iron or copper, and by adding decorations of the woods to the catechu beck.

Greys and Modes.

Boil sumac or galls for half an hour in water. Galls should be twice boiled. To 11 lbs. of the ware are taken 52 pints of water. Put into the dye pan 5 pints of the above liquor and 10 pints of water, and stir them about for half an hour at 122° to 144° Fahr. Take out and cool, and enter in at 51° Tw. for 20 to 30 minutes. Take out, spread them in the air, and finally wash well.

If the buttons are steeped in the different mordants, such as acetates of lead, copper, alumina, and lime, a number of modified greys may be obtained, as also by the addition of decoctions of logwood, red woods, fustic, etc.

A decoction of anatto yields with these mordants, and along with the woods, reddish and yellowish tones in great numbers.

Olive.

The buttons are mordanted with alum, dyed in bark liquor, steeped in black liquor, and returned to the bark bath.

The dyes can all be preserved for future use if no mordants have been added. The greatest clearness in the dye pans, etc., is necessary. In order to dye spotted and marbled buttons five or six dozen are spread out on a board, and colored spirit varnish is then sprinkled over them. They are then allowed to dry and dyed as above, though the blot must not become hotter than 110° Fahr. at the outside, as at higher temperatures the varnish dissolves. After dyeing the buttons are placed in warm soda-lye, which dissolves off the varnish, and the spots where it has been appear white on a dark ground. Patterns, checks, etc., can be obtained by the application of stencils.

For dyeing aniline colors the buttons are first laid in a mordant composed of 1 oz. tannin in 52 pints of hot water.

The buttons are introduced at 100° Fahr. for half an hour, and are then transferred to the aniline bath at from 122° to 144° Fahr.

Thus for a lilac dissolve ½ oz. aniline violet or methyl violet in 26 pints of water.

For blues, soluble aniline blue is dissolved in water, and with the addition of a little tartaric or acetic acid.

Red is dyed with magenta, raising the temperature to 167° Fahr.

For scarlet the buttons are dyed yellow with fustic and a tin mordant, and topped with saffranine.

Greens of a bluish tone are dyed with methyl or malachite green dissolved in water at the temperature of 122° Fahr. Yellow shades are got with the addition of a fustic liquor and a little alum or picric acid.

Orange is produced by a solution of naphthalene orange in water at a temperature of 167° Fahr.

Buttons dyed with aniline colors do not require to be rinsed, as all superfluous color is rubbed off in the polishing drum. Those dyed with mordants and woods must be well rinsed, dried in a warm place, and then polished in a revolving drum with chalk and the turnings of the buttons.—*Muster Zeitung für Färberei, Druckerei, etc.*—Chemical Review.

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TEXTILE COLORIST.

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Vol. 2.

Philadelphia, December, 1880.

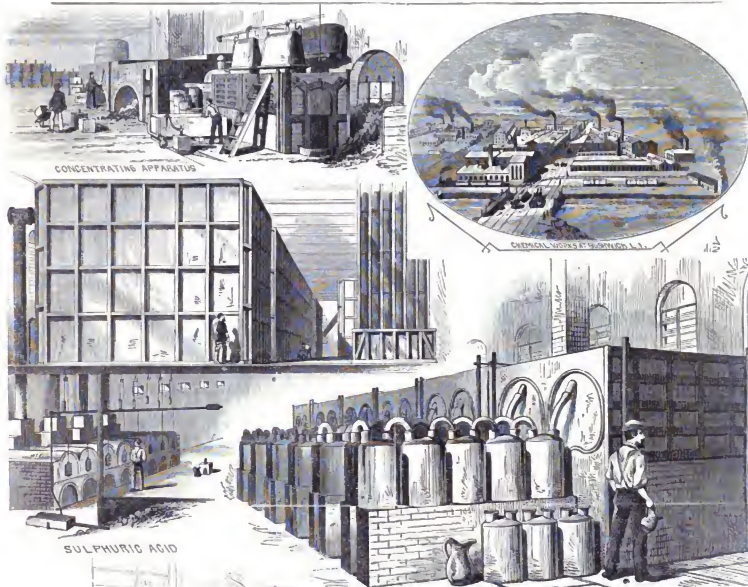
No. 24.

The Chemical Works of Martin Kalbfleisch's Sons.

In presenting to our readers the accompanying illustrations of the most extensive chemical works in this country, we cannot refrain from an exclamation of surprise at the wonderful advancement of the science of Chemistry in a country so comparatively young as ours; and our surprise is the greater when we consider the fact that sulphuric acid, or as it is also called oil of vitriol, is the main article of commerce made at these works, and that in its manufacture it leads to the making or production of other acids

which come forth collaterally, as it were, in the course of the making of the first mentioned acid, it surely is a subject of interest to all our readers, and especially to those who previously have never bestowed a thought upon it.

To the Dyer sulphuric acid is indeed of very great importance, and all these relative products incidental to its manufacture on so immense a scale are of value to him likewise, for this energetic company includes in its operations muriatic and nitric acids, aqua fortes, aqua ammonia, muriate of tin, blue vitriol, tin crystals, alum,



and sulphate of zinc; all and each of which are of importance in the coloristic art.

As its name imports, sulphuric acid is made by burning sulphur in combination with atmospheric air in certain proportions, at the same time one part of water is saturated with the fumes of the burning sulphur, and this one part of water contributes one part of oxygen. So important is it to observe these proportions that without the most accurate care it is impossible to produce the sulphuric acid.

The burning of the sulphur takes place in cell-like furnaces located next to each other and having at the rear large flues for the escape of the vapors as well as the creation and support of a draught. These flues, or chimneys, are of course, correctly calculated to

lead chambers in which it becomes hydrated and oxidized. There are various modes of imparting the requisite proportion of oxygen, every establishment has its own plan of procedure, and even the problem of effecting the purpose through the agency of sodium nitrate or saltpeter of Chili, chemists have, as yet, failed to agree as to the reaction by which the required results are finally obtained. The sulphur consumed has its proportion of nitre, and this is put in a vessel covered with vitriol and placed in a furnace (before described) where it becomes converted into nitric acid, which when it reaches the leaden chambers above where sulphurous acid, air and water combine, is transformed into nitrogen trioxide, freely parting with the chief part of its oxygen to oxidize those vapors and thus change the sulphurous into sulphuric acid. This plan, however, is



NITRIC ACID

effectually carry off the full amount of vapor, and even when in combination to form a chimney stack the capacity of each must be of the same area as though independent or isolated.

The bottom of each of these furnaces is sheeted with iron to prevent the waste of material through gratings, and to afford an opportunity to burn out remaining sulphur by building fires under these iron bottoms. Thus the sulphur is made self-consuming, due care being taken to admit only as much air as is necessary to create a moderate heat under the bottoms.

The furnaces are kept in continuous operation throughout the year; from 60 to 70, or 75 lbs. of sulphur being the supply for each furnace according to its capacity, and the time occupied in consumption averages three hours. The sulphur-vapor is conveyed from the furnaces by very large leaden flues opening above into capacious



CHEMICAL WORKS, BUT NEW N.Y.



LEADEN CHAMBER

not followed in the establishment now under review because in it the manufacture of nitric acid forms an independent branch; and instead, the nitric acid is passed direct into the leaden chambers in place of being made in the furnaces, as above described. Those leaden chambers are on a grand scale, and consist of five for each set of furnaces, which, of course, might be divided up in the interiors by partitions. Their capacity is something wonderful, in fact it is said to be upwards of 100,000 cubic feet! The economy of using lead is to be found in the fact that it is most durable, not being affected by the acid. The lead in sheets is secured to a wooden frame by leaden straps, and as no solder is, or can be used, those sheets have their edges melted together. Steam jets are used in order to assist the ascent of the sulphur vapor, and similar jets are used inside the leaden chambers to aid in the combination of the

sulphurous acid fumes. And here may also be placed nitric acid, either in jars from outside, or by means of siphon tubes; so as to have such a constant change of surface presented to the vapors as it yields its oxygen in the formation of sulphuric acid. It is, however, readier and better to bring the vapor and acid into direct contact in the second chamber of the cells by a tube running low down through the first chamber when (on account of its being largely hydrated) it takes up an excess of nitric acid with remarkable acidity. The whole is

then taken back by a low tube to the still lower in the first chamber underneath the first tube. In this first chamber, being exposed to a fresh mixture of the gases, it gives forth nitric acid in a large proportion. Next, the acid is carried back again to the third chamber, where the whole of the acid is collected. This third chamber is lower than the others, and to thoroughly effect the mixture of the gases several steam jets are brought into use. The acid trickles from a drip provided for that purpose, and here its strength is determined, which, before it goes all the concentrating retorts is from 45 to 50°. This grade is not sold; it is utilized on the premises. The condensed gaseous products of the other chambers are conveyed back to the third chamber, and the nitrous vapors and atmospheric air taken to the coke columns, contrived originally by the eminent French chemist, Gay-Lussac, and called after him, "Gay-Lussac's Towers." They are narrow but high chambers, with lead lining, and are filled with coke through which trickles the oil of vitriol; and the waste gases from the several chambers percolating through these pieces of coke give out their nitrous fumes, thus creating nitrous acid, which being again used in the chambers, waste is avoided and all is utilized. And here it may be observed that the proper temperature of these chambers may be maintained by the increase or diminution of the supply of nitric acid or nitrous gas, the larger the supply in a certain space of time the higher the temperature. This should be 40 to 44 degrees C., when, say, five feet from the floor of the chamber; varying from 40 to 60 degrees when approaching the centre of the chamber.



After leaving the chamber the acid is still further concentrated by two operations, viz.: in open lead pans set on plates of iron, and then in platinum stills. This concentration is by open lead pans raised to a temperature of 60° B., and a specific gravity of 1.75.

Many unsuccessful efforts have been made to find substitutes for these very beautiful platinum stills, which are very expensive—amongst others glass has been tried, but its brittleness counteracted all its utility and economy. The stills are placed one rising above

another. The acid is conveyed from them in tubes or leaden pipes to earlows holding from eight to ten gallons, packed in boxes and shipped; the mouth end of each earlow being carefully stoppered with clay, with a covering of strong canvas, having a good coat of tar.

These precautions are strictly necessary lest the admission of atmospheric air might give forth water, through the action of the acid.

The protection of the body of the earlow from accidental fracture is also very necessary, as the escape of acid would at once char all the straw packing, and also the box itself.

The manufacture of nitric acid requires eighteen ovens, three of which are in use each day; they are circular, being 4½ feet in

diameter and 8 feet deep; in charging them nitrate of sodium and sulphuric acid are deposited in equal quantities; fires started, and in from twelve to eighteen hours the charge is burned off. The vapors given off are conveyed from the rear of the ovens by clay-lined pipes into a series of receivers and flasks made of earthenware or glass, connected together by earthenware pipes. The condensed vapors contained in the first two or three vessels consist of strong nitric acid. Water is introduced into the other vessels for the

purpose of condensing all the fumes, the acid thus made being of diminished strength. The best grade of acid is a colorless transparent fluid, having a specific gravity of 1.55, and the boiling point at 80° C. Ordinary aqua fortis has a specific gravity of 1.19 to 1.25. It becomes double aqua fortis when the specific gravity is increased to 1.35 to 1.45. The spirits of salts, also known as muriatic acid, and as hydrochloric acid, is a solution of the gas

given off during the decomposition of common salt by sulphuric acid. Water, at 15° C. will absorb over 450 times its volume under atmospheric pressure. It is prepared by cast-iron cylinders luted with clay.

Each of these cylinders has an earthen pipe at one end, conveying the gas to a condensing apparatus with a leaden funnel through which sulphuric acid may be introduced. The construction of the furnace permits the flames to surround the cylinders while the gas is carried off by a rear pipe into a series of receivers, the first receiver has raw acid and the remainder water, in small quantity in each, serving for the absorption of vapor.

The raw acid contained in the first receiver is distilled and its product purified in water; the first part of the distilling, which contains chlorine, is rejected. The saturated solution is drawn off into carboys.

Alum is a product of either alum-stone or shale, or of earths containing various proportions of alum, combined with other salts.

Alum-stone is of a reddish color commonly, but the purer sort is white and crystalline. It is burned and evaporated in solution to a crystal state. There must be neither too little nor too much heat, least either the sulphuric acid be driven off, in the first place, or the stone be too much integrated in the latter. Consequent on the burning the stone is formed into a paste and lixiviated in hot water in pans or tanks. On becoming clear the liquor is drawn off, evaporated at 50° C. and allowed to cool and crystallize in vats. The heat is most carefully regulated by steam-pipes, in connection with the vats.

Blue Vitriol is a product of metallic copper in ore of about 60° per cent. heated and combined with sulphuric acid. It is the base of many of the piquents obtained from copper. It is used both in dyeing and printing.

Aqua Ammonia is manufactured in a large iron still with sal-ammonia, or ammonium sulphate is deposited together with an equal weight of quick lime slacked in four times its weight of water, well stirred together. The aqueous vapor and ammonia are driven

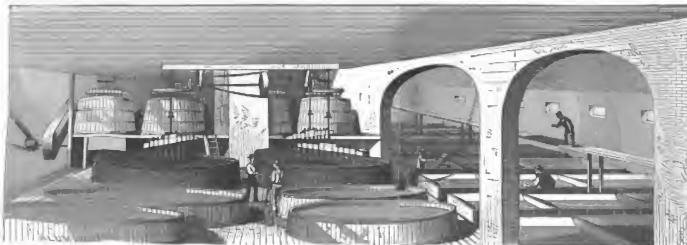
off by the application of heat. This vapor is condensed in the first vessel, and in the second the ammonia is absorbed by the water.

Muriate of Tin and Tin Crystals are manufactured by dissolving granulated tin in muriatic acid; the residue being colorless, transparent deliquescent crystals easily soluble in water. The aqueous solution forming the muriate of tin depositing a basic salt, in case no more hydrochloric or tartaric acid be added.

White Vitriol or White Copperas is also known as

sulphate of zinc and is produced by dissolving either zinc or its oxide or carbonate in sulphuric acid, diluted. By evaporating the carbonate it separates into small crystals as an opaque granular mass. It is used in dyeing as a mordant. It is likewise used in printing.

Finally.—The pottery is carried on, on the premises, and in consequence of the immense demand and the constant casual breakages this is by no means an insignificant feature of the great industry. In fact the kilns are very peculiar in themselves and were originated by the late Mr. Kalbfleisch who took great pride in them.



There are few industrial establishments so wide spread and so very interesting. They have branches in Brooklyn and Buffalo, N. Y., and in Bayonne, N. J., each having its own share of the vast business; but all being under one head, whose office and store are at 55 Fulton street, N. Y.

This great concern is an honor as well as a credit to our country, and few can look upon the accompanying illustrations of the *Scientific American's* artists which so perfectly depict it, without a feeling of admiration for the spirit displayed throughout by the firm of MARTIN KALEFLEISCH'S SONS.

The Relation of Color to Light.

Following the subject of our article in the November number on Colors, Tints and Shades. We will now call the attention of our readers to the facts which refer directly to the influence of light in the formation of shades and tints of color, a subject the study of which cannot fail of making the dyer better acquainted with the great principle which underlies his beautiful art, and of generating in his mind numerous inquiries leading to a more perfect acquirement of knowledge in it.

The difference, or rather the positive distinction between white and black may be reasonably attributed to the presence of light in the former, and the total want of it in the latter; and the graduation of tints may be likewise referred to the ability of each to resist light. Thus, we see the brighter colors to be the lighter, and the heavier and more somber to be the darker; until, finally, color becoming so dense as to exclude light altogether, black is the inevitable result.

Such, however, is not the case with the solar spectrum; for in it neither white nor black finds existence, and the darkest of the prismatic rays retains a certain amount of light—consequently these two are equally negated, and, therefore, cannot be denominated "colors."

A recent very decisive proof of the resisting power of the darker colors to the passage of light through them is to be found in the fact published in the French scientific journal, *Comptes Rendus*, to the effect that actual experiment under glass conclusively proved that the eggs of fish were most rapidly developed under the influence of light colored, and most retarded when subject to the intervention of dark colored glass.

The solar spectrum colors are: violet, indigo, blue, green, yellow, orange, and red. All these find their origin in the three primitive colors, blue, yellow, and red. These blending into each other form or generate the colors of the solar spectrum named above. It is well ascertained that the white light runs through each and all of these; and it has been suggested that a portion of each of the primitive colors is embodied in every part of the spectrum, each being most intense at those points where it presents its character most definitely. Yellow showing the brightest, orange next, and red following at the one end of the spectrum—whilst at the other, again beginning at yellow, we have green, blue, indigo, and violet. But besides these colors many graduations of them give us still others, and the innovation (if it may be so termed) of the aniline dyes has

present a rendering of these that gives to our esthetic art a vastly wider field of action than was dreamed of by our fathers. This field is yet expanding and is still expansive, and let no one suppose he has learned all there is to learn; for the want grows in a greater proportion as the knowledge is acquired. In fact we are students all the time!

Every color has its "complimentary," which is virtually a white-light; suggestive of rest for the eye of the observer, and seems as though Nature graduated the distinction between the relative colors, and then made each the brighter by this mode of induction, or expression, so to speak. Even this white-light itself has been found by Sir Isaac Newton, to be subdivided into very minute particles of rays, as are the colors of the spectrum. Showing that grading and blending goes on in the one as well as in the other, and with a mutual action.

Yellow, being the nearest akin to white-light admits its full intensity, and is therefore, the brightest color in the solar spectrum, as we have before observed. It is also the most active and useful of colors, as it not alone blends with the others but gives life and brilliancy to all. Burnished gold is far more admirable than silver; as the rays of the sun are infinitely brighter than those of the moon, because the light directly accompanies the one and indirectly assists the other.

Light then bears the same relation to color that heat does to vegetation. Vegetation also owes its color to light; for, we well know that the plant which is reared in a dark place is of a sickly hue, and lacks the bloom of color which sun-light gives.

On another occasion we will return to this subject, so deeply interesting to dyers, yet so seldom taken notice of by those who write for their information.

Golden Yellow for Cotton.

Pass the cotton, boiling, in a soap bath; that is to say, in a bath of lukewarm water containing a little Marseille's soap. After a half hour, wring and pass through another bath formed with cold water and 150 grammes of bichlorure of tin for 5 kilos of cotton. After having given 10 turns in this last mordant prepare a bath of nearly cold water, pour in a little glue (joiner's glue dissolved in boiling water). This ends the mordanting and, having wrung the cotton, prepare a tepid color bath, in which put 30 gr. golden yellow for cotton per kilo. After 30 minutes, raise and add more acetate of alumine. Give some more turns and dry. For wool and cotton stuffs a little warm dye. Baths of soap and bichlorure of tin make it fast.

This process, which we have seen applied, gives magnificent results.

[This recipe, which is accompanied by a sample, we translate from *Le Teinturier Pratique*, without endorsing it.]

FOR REMOVING ALIZARINE INKS.—White goods, tartaric acid, the more concentrated the older are the spots. On colored cottons and woollens, and on silks, dilute tartaric acid is applied, cautiously. —[*Chemical Review*.]

Ostrich Feather Dyeing.

BY PAUL ALEX, PRACTICAL FEATHER DYER.

(Continued from page 243.)

GARNET.

As there is seldom as large an amount of feathers dyed in garnet as in blacks; and, as by my process, they require but one bath, the time occupied in producing the color is very short. Nevertheless, they require as much care and attention, if not more, than blacks.

Very rarely more than four or five hundred feathers (two or three lbs.) are done at one time, and as follows: Say you have the above amount of white cape goods to dye garnet. Have them selected, as to size, and strung, not more than fifty on a string; wash them thoroughly. It is not necessary to have them soak, if you have not the time to spare. Use soap and elbow grease freely.

Before proceeding further, I will say that in using soap do not rub it from the bar on to the feathers, but take a small boiler, pare down about one-half pound of good pure soap; cover with water, and boil, or dissolve it into a jelly by the best method known to you. After preparing your wash-water, add enough of this liquor to produce a good lather. My reasons for using the soap in this, that usually before stringing your feathers the quills are cut short, and as they are hollow they often, during the rubbing of the soap from the bar, get filled up by pieces, which all the rinsing you can give to them will not remove. And as, by experience, I know that soap will add nothing to the production of a good color, but rather to injure it considerably, or spoil it perhaps, it is therefore absolutely necessary to have every particle of soap removed.

After washing and rinsing thoroughly, starch your feathers, and have them dried by the usual process. To thoroughly expand your flues, it is necessary to beat them constantly. The dyer who will ignore this, deserves as good a beating as his goods should have had. Feathers that have been poorly washed and dried will be found very often with the flues towards the bottom, and close to the quill to appear almost like threads still sticking together. It would be proper to have such washed again; but, as a substitute, you can take and, by the aid of your two brushes, expand every flue. I would advise entering them dry, in preference to wetting them, previous to entering the bath. If your bath has been properly prepared it is only necessary to allow them to remain until it is cold; and if an extra rich and brilliant color is desired, take your feathers out a few minutes after entering, rinse and dry them; warm your bath again to the nearest temperature to boiling, re-enter, and let them remain until cold. Have them dried on a board used for that color only.

I will here say that logwood is the basis of my color, and I seldom mix a bath for garnet alone. I make my browns, plumbs, and garnet all in the same bath. The reader must understand that it does not take as long to make the color as it does to tell how to make it, although some dyers care not what time they spend in the production, if the result is only satisfactory. But my study is how to produce the best colors in the least possible time; and I can say, without fear of contradiction, that I can take one hundred feathers and produce a distinct shade on each one, to match sam-

ples—that is, one hundred colors or shades of color, rather, in one day, between the hours of 7 A. M. and 6 P. M., including navy blues, seal browns, bottle green and black; also, drying my own feathers. But as it is not exactly my object just now to teach the reader how to work fast but how to work well, I shall dwell on this no longer. You must learn to walk before you can run. It is better to enter the bottom part of your feather first, a few seconds previous to entering them all, as experience has taught every dyer that the tip of the feather takes the color much faster than the bottom. Should your feathers come one or two shades too dark for your sample, one or two drops of sulphuric acid dissolved in your starch water will be found to bring the desired shade. You may require more or less, so you must consult your own judgment as to the exact amount. Should you, by accident, or carelessness, I should say, allow your color to come too light, the only satisfactory remedy is to carefully rinse off all the starch and acid. Warm up your bath and enter them again, allowing them to remain until the desired shade is obtained.

(To be Continued.)

The Identification of Coal-Tar Colors.*

BY J. SPILLER, F. C. S.

Dyers and others who are in the habit of using the coal-tar colors are familiar with a number of chemical reactions by which the members of the series may generally be classified and identified. Differences are remarked in their relative affinities for various sorts of fibers, some colors being taken up freely by silk, others fixing better upon wool, and some few, like saffranin, exhibiting a special affinity for cotton. Again, as with the yellows, great differences are observed when the operator proceeds to work with a free acid or a weak alkali in the dye-bath, primrose (naphthalene yellow) requiring the former, but not so with phosphine (erysaniline yellow), which demands a neutral or even slightly alkaline bath.

By the study of these conditions, aided by a few characteristic tests, it is often possible to identify coloring-matters of unknown or doubtful origin, and it is with the view of extending the number of such readily available tests that I recommend a more frequent appeal to the color reactions with sulphuric acid.

For this purpose but small quantities of material are required, a few grains serving to impart a distinct color to a comparatively large bulk of sulphuric acid, and the resulting indications are in many cases both specific and permanent. Oil of vitriol, which so readily destroys nearly all organic structures, does not carbonise any of the coal-tar colors, or does so only under severe conditions, as at high degrees of heat. Even indigo and madder, although of true vegetable origin, are known to yield up their coloring-matters to sulphuric acid, the old processes of dyeing depending upon this fact. In the manufacture of garancino from madder the woody fibre and organized tissues are destroyed by the action of sulphuric acid, whilst the alizarin glucose survives, and with it Turkey-red goods may be dyed.† Instances might be multiplied as proof that color-

* Paper read before the Chemical Section of the British Association, Swansea Meeting, 1888. By Mr. J. Spiller, F. C. S.

† See W. H. Perkin's "History of Alizarin," *Journ. Society of Arts*, May 1879.

ing-matters, both natural and artificial, resist the attack of oil of vitriol, and the large class of sulphonates (Nicholson blues, "acid roscine," etc.) may be cited as establishing the fact that coloring-matters are not so destroyed, but form combinations with sulphuric acid.

If, then, the body under examination be dissolved in strong oil of vitriol, a color-test is at hand whereby useful inferences may be derived as to the nature of the dye, and often its exact identity disclosed. A few direct confirmatory tests may then be applied. The most remarkable color reactions are the following:

Magdala (naphthalic pink)...	Blue black.
Saffraan.....	Grass-green, becoming indigo-blue on strongly heating.
Crysoidin.....	Deep orange, turning almost to scarlet on heating.
Alizarin.....	Ruby-red or maroon.
Eosin.....	Golden yellow.
Primrose (naphthalic yellow).	Difficultly soluble, first yellow, and color discharged on heating.
Crysaniline.....	Yellow or brown solution, of marked fluorescent character.
Aurin.....	Yellowish brown, non-fluorescent.
Atlas orange.....	Rose color, turning to scarlet on heating.
Atlas scarlet.....	Scarlet solution, very permanent on heating.
Biebrich scarlet, R.....	Blue-black or deep purple.
" " B.....	Bluish green.
Aniline scarlet.....	Golden yellow, permanent on heating.
Indulin.....	Slatey blue to indigo, according to shade of the dye.
Rosaniline, regina, and all violets.....	Yellow or brownish yellow.
Phenyl and diphenylamine blues.....	Dark brown solutions.
Iodine green.....	Bright yellow solutions, the former giving off iodine on heating.
Malachite green.....	
Citrone.....	Pale cinnamon or neutral tint.

After vitriol the action of concentrated hydrochloric acid may be next tried, which distinguishes at once between saffraan and Biebrich scarlet, the former giving a violet solution and the latter being precipitated as a red flocculent powder.

Proceeding in this way, and combining the observation with

the dyer's usual test, every one of the substances named can be readily identified, and much time saved in the examination of dye-stuffs.—*Textile Manufacturer, Eng.*

Suggestions on Feather Dyeing.

(Continued from page 264.)

There is no serious difficulty, as previously demonstrated, in dyeing feathers in black, so far as they are separated. But the facilities somewhat disappear whenever the feathers have to be dyed on the skin. One of the reasons for the practical difficulty lies in the fact that heat and sulphate of iron have a disintegrating action on the skin which falls into shreds before the required temperature has reached the bath. There is a possible exception to this rule in the case of pigeon wings, because the dermic tissue is of a closer texture. But yet the process requires care and skill, so far as the manipulation of the hot dyeing is concerned.

The best method for overcoming troubles in the black dye consists in soaking the skins over night in an oxidated iron bath before going to the dyeing proper. The black dye by carmine indigo, terra and orchilla is more propitious than by sulphates and dye woods. But it is difficult any how to obtain a fine shade and cast. There are also risks of damage to the tissue since the sulphuric acid, required in the bath, and the carmine indigo are corrosive enough to deform or shrink the skin. However, in observing the following rules there is some chance of success in this dye:

1. No temperature over 50°, if the feather is tender; 70° if it is hard. Leave it in the bath longer to compensate for the reduction of heat.

2. No sudden heating; nor rapid cooling.

3. The least possible acid in the bath.

The aniline process offers some advantage in being cold. It preserves the skin in its natural form and size. Though not always successful, the following formula may be applied, with some chance of success:

Make a bath composed as follows, viz.:

Aniline 1 part,	} Water in proportion.
Perchloride of iron 1 part,	
Muriatic acid 2 parts.	

Let the skins soak for 5 or 6 hours in that bath. Raise, press and re-enter in a weak solution of bichromate of potash for 15 minutes. Repeat this operation until the proper shade is obtained.

Oftentimes the result is fine; the black shade is beautiful and brilliant and the feather is supple, uniform and well shaped. But the dye discharges more or less; it is a drawback. It must be observed that some feathers, such as Pelican's, are refractory to a good cast. Some come out bronzed or grayed. Aniline salt has been replaced by its chlorhydrate (called aniline cakes) and the perchloride of iron by vanadium or chlorate of copper. The foregoing inconveniences were the same notwithstanding. It must be concluded that black aniline is not yet entirely practicable in feather dyeing. The bichromate of potash process is the only one giving good results. It presents but one obstacle, that of requiring two baths, viz.:

1st. 100 litres logwood liquor.
1 kilo, yellowwood, terra or quercitron.

Boil, to extract the coloring matter from the added bark; pour in some sulphuric acid, to turn the bath red.

2d. Water.....	100 litres.
Cream tartar.....	1 kilo.
Bichromate potash.....	64 "
Sulphate of copper.....	50 grammes.

Raise temperature to 55°; let in the hides or wings over night. Drain and press them gently and enter in bath No. 1 raised to 55°. Leave in four or five hours. Then alternate the immersions from one to the other bath until shade is obtained. Wash in soap, rinse and pass to hydro extractor as usual. Care must be taken in handling gently—the birds are generally very delicate.

METALLIC CAST.

These sorts of reflects are obtained, plaster-like, by applying metallic powders on the feathers; but this is not dyeing, proper. There is a regular method for obtaining these casts in the dye.

It is well known that all substances possess two colors; one by transmission, and one by reflection. The transmission is produced by the crossing of luminous rays, which more or less penetrate through. The reflection is the effect of the absorption of certain rays of the white light falling on it and reflecting certain other rays. These combinations of transmitted and reflected rays give the colors proper. Being given two surfaces, one white and the other black, on paper or tissue. If a coating of fuschine solution is applied on the white, we will have a violet-red; on the black, we will have a metallic reflect of a bronze color, or of a cantharid cast. This is the reflect of fuschine. The other is the transmission of white light crossing the red color. The light falling on the black surface is absorbed or stopped, and can only reflect at the black surface, which seems to be metallic. To obtain the same result on feathers, the black or dark dye must be applied first as a base, and with the other lively colors afterwards as a surface reflector. Generally for this style, there are but two colors employed; the fuschine and the Paris violet. The first gives the *bronze*; the second gives the *golden bug*.

(To be continued.)

Scouring, Sizing, and Calendering Machine.

A new apparatus invented by Mr. John Leach, of Rockdale, permits this triplicate operation simultaneously, or rather continuously, on wool, cotton, or linen yarns, readily prepared for weaving by the process. The yarns being disposed on bobbins, as usual, are placed on an angular plane of 45°, corresponding with the centre line of the drying machine.

The threads unrolling from the bobbins are traversing a series of cycles or small rings perforated on plates screwed on the vat containing the required ingredients.

This vat is divided into compartments for the different matters used. The first contains an ammoniated liquid, or it may be any other scouring fluid. The threads dipping into it in passing around a fluted roller, of an anti-corrosive matter, at the bottom are conducted between pressing rollers before entering the second compartment which contains water, slightly alkalinized for rinsing. Hence, the yarn continues on its course in the third compartment contain-

ing the sizing matter, either vegetable or animal, dipping this size by the same conducting process of rollers placed in the paste, the yarn reaches in an impregnated state, the drying drums after having discharged the superfluous sizing, under a gentle pressure performed over the compartments.

Three connected dryers, are heated by steam, and they receive the yarn on their whole surface, through an oblique disposition of the sizing delivery.

From the drying drum the yarn passes on to a perforated plate, and over a moving brush, marking the proper length of the web with a coloring touch. After being marked the fabric is carried on a tramway to the proper divisions of the comb and the loom.

The separating roller is so arranged that at a certain number of layers, corresponding to any required length of yarn, a stop is automatically effected, of which a bell-tap warns the operator.

Of course, the drying apparatus may be of various shapes, sizes, or numbers, according to requirements. A ventilator placed under the heated drums is also useful to absorb the moisture evolving from the steaming yarn.

[This process seems rational enough, but the inventor does not clearly indicate the economical way for introducing the yarn into the compartments containing the liquid ingredients.]

Is it necessary to first pass the yarn into them through the conducting rollers, before the liquid substances are put in, or, can the rollers be lifted up through grooves, in order to place the yarn between before dipping? This last mode is suggestive of a permanent operation, without removing the sticky or the scouring matters when a new sort, or a new batch of yarn comes in.—EDITOR.]

Coloring Matter from Acetic Acid.

M. G. Witz has submitted to the Industrial Society of Rouen an essay on new colors derived from impure acetic acid of commerce. He has produced an intense orange, in crystals, by the treatment of impure acetic acid with *nitrites*, salts of nitrous acid, very soluble in acetic acid. This acid, at 7° Beaume, or 40 per cent. of crystallizable principles, receiving a solution of one thousandth part of azolite of sodium (nitrite) produces a notable quantum of the coloring matter in question. After a few days of rest the crystallization is visible in flocculent matters in suspension, collecting gradually in iridescent needles. The soluble part of the acid is intensely orange, and can be used at once for dyeing in connection with the nitro-acetate of chrome, or otherwise. Besides this immediate coloring matter, 10 kilos. of impure acetic acid have produced 2 gms. of the crystals above referred to, by the addition only of 4 gms. nitrite of sodium. This proportion is somewhat extreme; any more would give a violet cast to the product. Heat is also adverse to the operation. A fine silk sieve or filter separates the crystals from the mother liquor.

[Nothing is reported yet on the practical and economical value of this new yellow, which the inventor calls *nitropropiogelmine*, but the discovery is a logical and natural link of the long series of hydrocarbon colors. This coloring matter is, in principle, a derivation similar to those from mineral or vegetable tar.—Ed.]

TEXTILE COLORIST.

Dr. M. FRANK, Manager.

PUBLISHER'S NOTICES.

The TEXTILE COLORIST is published on the 15th of each month at the office, 505 Arch Street, Philadelphia.

The TEXTILE COLORIST will be sent by mail to any address within the United States, on payment of the yearly subscription of FOUR DOLLARS (variably in advance), postage free For Great Britain and Ireland, 5 shillings (British). Subscribers in foreign countries will have the additional postage added to their subscription. REMITTANCES may be made by mail by means of Post Office order or check, payable only to order of Dr. M. FRANK, Manager.

TEXTILE COLORIST, 505 Arch Street, Philadelphia.

As all our agents and solicitors are furnished by us with written authority, we request our friends not to favor those having no credentials from us.

As no subscriptions received for less than one year.

Our Holidays' Greeting!

TO OUR PATRONS GENERALLY.

The close of our second year finds us at this happy season in a prosperous condition; and for that pleasing state we have to thank our friends and supporters, chief among whom are our *subscribers* and *advertisers*. The former we look upon as our arterial blood, and the latter as our muscles. Without either the one or the other our TEXTILE COLORIST would have but a precarious existence indeed! With both these constituents in full vigor, healthy growth and accumulating strength must be ours, enabling us to go forward with a cheered heart, with a hopeful feeling pervading our efforts.

Popularity is seldom, if ever, undeserved. It is, in fact, the acknowledgement of the credit due to successful endeavor in any undertaking whereby the community reaps a benefit. Temporary admiration may be acquired by mere display, but it is transitory, and only transitory, for the public soon tires of display alone. Utility is, after all, the one staple element of true popularity, and that utility must stand the test of time and experience before it can look forward to popularity.

This then has been our aim from the outset of our undertaking—not to surprise the community with mere meretricious display, accompanied by specious promises, but to enter on our work in a plain matter of fact style, performing as we go along, and improving as we advance.

The public eye is ever open to its own advantage; and when we began by giving value, and continued in that course, we gained our popularity and secured it.

This is no idle boasting; for, our present position attests its truth. The TEXTILE COLORIST is an acknowledged authority in all matters relating to the great Tinctorial Art; and its judgement is sought for whenever a question arises which requires a critical decision.

To obtain this enviable position called forth the intelligent efforts of all our co-laborers, as well as our own; and for this aid, so ably given and so intelligently continued, we render our grateful thanks to our contributors, professional and otherwise, who have

never failed us, nor ever disappointed our readers in the value of their contributions.

To those patrons who are manufacturers of dyes, and have favored us with samples of their productions, we give our hearty congratulations on the success of their efforts to please.

To the community of dyers generally we offer our greetings, rejoicing with them in the successful progress of their esthetic industry, and hopefully looking forward to the triumphs of the future!

To all and to each we hold out the hand of friendship and gratefulness; and trust that in the coming year, as in the past, our mutual effort may be one of continued success.

TO OUR CONTEMPORARIES.

We stand indebted to the textile press of England, France and Germany for information which, from time to time, we have freely borrowed from their pages; and we must acknowledge the courtesy with which the liberty we took was recognized, especially by Dr. M. Reimann, proprietor of the *Farber Zeitung*, whose personal testimony is among the most flattering on our letter files, and especially grateful to us as coming from such a source. To our English and French friends of the textile press, we offer our kindest regards, and trust that a community of feeling may ever continue, as in the past, to govern our common effort to advance the best interests of the Dyeing Art.

To the talent so constantly displayed by our foreign friends, we must bear free testimony; and to our English contemporaries in particular, we must say in addition that, however we may mutually differ as to points of national policy on our peculiar topic, we are nevertheless most willing to credit the untiring ability, as well as the liberal spirit, of our cousins in pushing on the good cause we are alike engaged in, and in affording us opportunities of presenting their good things to our readers, but never without due credit.

Our Holiday Number.

As will be seen, we give our friends and patrons a bright and joyous greeting in this issue of the TEXTILE COLORIST. But, let no too sanguine reader suppose that this display of dyeing-samples can be repeated more than once a year. This is an extra effort on an extra occasion, on which we are desirous of showing the progress of our journal, and rejoicing in it aided by the splendid exposition of our good friends the manufacturing dyers of whom we might have had a host, but want of time and space limited us to the selection we have made. It is by no means an easy matter to prepare even what we have now presented for publication in one issue and we are sure our friends and patrons will realize the fact.

PIRACY BEYOND THE SEA.—We grieve to find that our good London contemporary the *Hatters Gazette* has hoisted the black flag, and pirated some of our editorials, especially that on "Color Blindness," in his recent issue, without giving us the slightest credit for the same. Now, we are no believers in Free Trade; nor do we suppose our intelligent friend is, for, if he were, we might be in expectation of a new hat to protect in future the emanations of our brain.

DYEING DEPARTMENT.

THE MONTH'S PRACTICAL RECIPES.

The following practical recipes, like all that will appear in this department, are verified as reliable and warranted to come out satisfactorily, provided the proportions are strictly adhered to, and the manipulation be workmanlike.

DIRECTIONS, NOTES AND COMMENTS.

☞ We have frequently been asked why we give the names of the makers of the aniline and dye stuffs we use when publishing the recipes accompanying our insets. The reason is: We can speak with authority for those we actually test; where anilines and dyestuffs of the same color, manufactured by other firms, may be equally good, but when treated according to our recipe, may not give similar results. In giving the name of certain manufacturers, therefore, we would not be thought partial to them. Each has his own mode of producing desired effects with his own dye stuffs.

Recipe No. 163.

FAST ONE DIP BLACK ON COTTON.

The method of using this Fast One Dip Black has been furnished by the manufacturers of the same, "Boston Dyewood and Chemical Co., of Boston, Mass.," and sample No. 163 has been dyed by us according to their directions.

50 lbs. Cotton Yarn.

To start dye-tub of, say 300 gallons water, bring bath to boil, and add:

- 120 lbs. One Dip Black. { Boston Dyewood and Chemical Co.
Boston, Mass.
- 12 lbs. Blue Vitriol.
- 10 lbs. White Soda Ash (ref'd).

Stirring well till all is dissolved. Enter yarn, and continue for one hour at boiling heat; handling well, to secure even color; remove cotton from bath, and allow it to remain exposed to the air over night. For additional fastness, pass in the morning, for about 15 minutes (say 6 turns), in bath of 1½ lbs. of Bichromate of Potash for each 50 lbs. of Cotton.

Prepare every succeeding dye-bath by adding ¼ of the materials for preceding tub, till a standard is reached, which will, of course, be determined by depth of shade required. Of chemicals not more than 2 lbs. of Soda Ash and 2½ lbs. Blue Vitriol will be required, after standard has been reached.

A tendency to brownish shade would require the addition of a little Blue Vitriol; to correct which may be done in the chrome bath. The best results cannot be easily obtained in the first dye-tub by any method of dyeing black. This One Dip Black will be found to work with improved results in each succeeding bath, although sample No. 163 is the result of the first dyeing, which has given entire satisfaction, and the test of fastness has surpassed our own expectation.

This One Dip Black will dye Cotton, or Cotton and Wool, in the piece; also Raw Cotton. We will, at some future time, bring samples.

☞ We request Dyers to test this dye, and we will be pleased to hear their result.

Recipe No. 164.

FAST BLACK ON LOOSE WOOL.

- 100 lbs. Wool (well scoured).
- Dissolve 3 lbs. Bichromate of Potash.
- 4 lb. Blue Vitriol.

Enter Wool, and boil for 1½ hour.

2d bath.—Boil out for 2 hours.

- 20 lbs. Camwood. { John M. Sharpless & Co.,
60 lbs. Logwood. { Philadelphia, Pa.

Then enter Wool, and boil for 1 hour. Sadden with 2 lbs. Coperas. Boil half hour, and leave to steep for 4 hours.

☞ This is a very superior black, stands fulling, and can be used, with satisfaction, for fine Cassimeres.

Recipe No. 165.

DARK REAL BROWN ON LOOSE WOOL.

- 100 lbs. Wool (well scoured).
- Dissolve 3 lbs. Bichromate of Potash.
- 1 lb. Blue Vitriol.

Enter Wool, and boil for 1½ hour.

2d bath.—Boil out.

- 45 lbs. Fustic. { John M. Sharpless & Co.,
52 lbs. Hypernic. { Philadelphia, Pa.
8 lbs. Camwood.
8 lbs. Madder.
14 lb. Logwood.

Then enter Wool, and boil for 1 hour. Sadden with 2 lbs. Coperas. Boil half an hour, and leave to steep for 4 hours.

☞ This is a superior dark brown; will stand fulling, and can be used with great satisfaction for Cassimeres.

Recipe No. 166.

BLUE MARGIN ON LOOSE WOOL.

- 100 lbs. Wool (well scoured).
- Boil up 5 lbs. Glaubersalt.
- 10 lbs. Alum.
- 7 lbs Hypernic.
- 4 lbs. Ext. Archil.

Enter Wool. Boil for 1 hour. Wash, and done.

Recipe No. 167.

WOOD DRAB ON LOOSE WOOL.

- 100 lbs. Wool (well scoured).
- Boil 24 lbs. Bichromate of Potash.
- 2 lbs. Arg'l.

Enter Wool, and boil for 1½ hour; wash.

2d bath:

- Boil 2 lbs. Hypernic. { John M. Sharpless & Co.,
8 ozs. Madder. { Philadelphia, Pa.

Enter Wool at boil. Boil for 1 hour; wash, and done.

Recipe No. 168.

ORANGE BROWN ON LOOSE WOOL.

- 100 lbs. Wool (well scoured).
- Boil 6 lbs. Alum.
- 5 lbs. Glaubersalt. { John M. Sharpless & Co.,
1 lb. Madder. { Philadelphia, Pa.
1½ lb. Ext. Archil.

Enter Wool at a boil. Boil for 1 hour. Wash, and done.

(Continued on page 277.)

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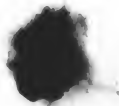
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PRICES CURRENT.

PHILADELPHIA, DECEMBER, 1880.

DYES AND DYESTUFFS.

Acetic Acid.....	5	6	8
Albumen, Blood.....	50	60	8
Albumen, Egg.....	85	95	8
Alum, ground.....	21	21	12
Alum, lump.....	40	40	12
Anise, dried.....	34	34	21
Annatine.....	1 30	1 50	
Aniline Oil, English.....	26	30	
Aniline Oil, French.....	26	36	
Aniline Salt, coarse.....	38	38	
Aniline Salt, cast.....	22	30	
Archil Liquid, best.....	16	25	
Argols, crude Oporto.....	19	19	
Argols, crude Sicily.....	19	19	
Argols, refined, Ast.....	28	32	
Argols, refined Gray.....	30	33	
Argols, refined Light.....	32	35	
Aqua Ammonia.....	61	61	
Aqua Ammonia, F. F. F.....	70	70	
Aurine.....	75	80	
Barbary Root.....	5	5	
Barwood.....	21	22	
Bi-Chromate Potash.....	12	12	
Bismuth.....	21	3	
Borax, refined.....	104	13	
Brass Wood.....	31	31	
Blue Vitriol.....	71	81	
Brimstone, roll.....	71	81	
Canwood, pure.....	8	12	
Canwood, No. 1.....	8	10	
Carbonate of Ammonia.....	20	21	
Caustic Soda, 60 per cent.....	51	6	
Caustic Soda, 70 per cent.....	51	6	
China Clay.....	24 00	25 00	
Citric Acid.....	90	95	
Cochineal, Honduras.....	65	70	
Cochineal, Mexico.....	65	70	
Cochineal, Black Tezcuiffe.....	69	65	
Copperas.....	1	1	
Cream Tartar, crystals.....	36	38	
Cream Tartar, powdered.....	38	38	
Crimson Spirilla.....	13	14	
Cudbear, pure.....	20	28	
Cudbear, No. 1.....	15	16	
Cudbear, No. 1 French.....	21	28	
Cutch.....	50	50	
Divi Divi.....	60 00	75 00	
Dipping Acid.....	10	10	
Extract Fustic.....	14	20	
Extract Hypericæ.....	19	25	
Extract Logwood, bulk.....	9	9	
Extract Quercitron.....	7	9	
Flavine.....	25	30	
Fustic, Cuba.....	11	11	
Fustic, Maracibo.....	11	11	
Fustic, Savinilla.....	11	21	
Gambier, bales.....	6	7	
Glauber's Salt.....	11	12	
Green Ebony.....	6	6	
Hypericæ.....	81	4	
Irish Moss.....	6	10	
Iron Nitrate.....	6	6	
Indigo, ordinary.....	14	15	
Indigo, Bengal.....	1 45	1 15	
Indigo, Caracena, fine.....	95	180	
Indigo, Guatemala, fine.....	1 35	1 10	
Indigo, Madras, fine.....	95	1 65	
Indigo, Madras, powdered.....	95	1 65	
Lac Dye, fine powder.....	18	22	
Lac Dye, good powdered.....	10	25	
Lima Wood.....	51	141	
Logwood, Caymanby.....	3	3	
Logwood, Honduras.....	3	3	
Logwood, Laguna.....	3	3	
Logwood, St. Domingo.....	11	11	
Madder, Dutch.....	11	12	
Madder, French.....	2	2	
Maple Bark.....	2	2	

Myraloids.....	12	lb	\$	5	6
Muriatic Acid.....	12	lb	1	1	1
Muriate Tin.....	12	lb	1	1	1
Muriate Tin, strong.....	12	lb	1	1	1
Muriate Tin, oxy.....	12	lb	1	1	1
Muriate Tin, crystals.....	12	lb	1	1	1
Newell.....	12	lb	1	1	1
Nitrate Iron, pure.....	12	lb	1	1	1
Nitrate Lead.....	12	lb	1	1	1
Nitric Acid, (Aqua Fortis).....	12	lb	1	1	1
Nutsall, Aleppo.....	12	lb	1	1	1
Onion Paste.....	12	lb	1	1	1
Oxalic Acid.....	12	lb	1	1	1
Pearl Ashes.....	12	lb	1	1	1
Persian Berries.....	12	lb	1	1	1
Pieric Acid.....	12	lb	1	1	1
Potash.....	12	lb	1	1	1
Prussiate Potash, yellow.....	12	lb	1	1	1
Prussiate Potash, red.....	12	lb	1	1	1
Quercitron.....	12	lb	1	1	1
Red Sarsaparilla.....	12	lb	1	1	1
Resin of Soda.....	12	lb	1	1	1
Starch, Corn.....	12	lb	1	1	1
Starch, Potatoes.....	12	lb	1	1	1
Starch, Wheat.....	12	lb	1	1	1
Salflower.....	12	lb	1	1	1
Sal Soda.....	12	lb	1	1	1
Sal Ammoniac.....	12	lb	1	1	1
Sal Soda.....	12	lb	1	1	1
Sassafras wood, ground.....	12	lb	1	1	1
Sulphide Blue.....	12	lb	1	1	1
Sugar Lead.....	12	lb	1	1	1
Sugar Lead, white.....	12	lb	1	1	1
Sumac, Sili, according to grade.....	12	ton	55	00	00
Sumac, Vicia.....	12	ton	55	00	00
Sulfur Ash.....	12	lb	1	1	1
Sulphuric Acid.....	12	lb	1	1	1
Tartaric Acid.....	12	lb	1	1	1
Terra Japonica.....	12	lb	1	1	1
Turmeric.....	12	lb	1	1	1
Ultramarine.....	12	lb	1	1	1
Vanillin.....	12	lb	1	1	1
Ward.....	12	lb	1	1	1

BUSINESS OPPORTUNITIES.

TO FOREMEN BLUE VAT DYERS.—WANTED, to learn the practical use of vats, by a dyer. A good bonus will be given for the instruction. Address, "Y. Z., Post Office, Boston, Mass., until called for."

WANTED*—An experienced dyer, to act as a traveling salesman. Good reference required. Address "Salesman," at the office of this paper.

WANTED, by a gentleman, an opening in a fancy weaving concern. Advertiser has a thorough knowledge of designing and weaving all classes of colored cotton goods, such as ticks, checks, fancy linings, cotton shawls, etc., and has had for several years the sole management of a weaving shed and dye-house. Address J. Drake, care of C. H. Hollinger, Bendleton, near Manchester, England.

F. J. BIRD, AUTHOR OF THE DYERS' HAND BOOK, is prepared to furnish reliable recipes in any branch of dyeing, and will have pleasure in matching to any color or shade for special customers, of his new Aniline Colors. See advertisement, page 8.

Address, 212 St. Marks Ave., Brooklyn, N. Y.

Regulation of Acetic Acid Boiling.—Used for analysis processes, acetic acid, especially for silk treatment, boils with an overfervescing excess, which is still increased when a porous matter is treated in it. Silk cannot be put in free from the danger of a complete run over. In order to avoid all such inconvenience, a rough blade apparatus, rolled around a glass tube, is introduced in the bottom of the recipient. It maintains in the centre of the liquid traces of the air enclosed in the roughness of the metal. This will regulate the boiling and prevent the excessive turbulence of the liquid when the silk comes in contact. When the platinum blade ceases to act it indicates that the wrinkling and the air have disappeared. Then the metal must be heated to restore all its properties as an atmospheric carrier and regulator.

SEVERAL new patents for the printing and dyeing of aniline colors on vegetable fabrics have just been issued in France, with claims quite different from the old authors.

(Continued from page 274.)

Recipe No. 169.

WINE ON LOOSE WOOL.

100 lbs. Wool (well teased).
 Boil 2½ lbs. Bichromate of Potash.
 2 lbs. Argol.
 Enter Wool. Boil for 1 hour. Wash.
 2d bath.—Boil out.
 80 lbs. Hyperic. } John M. Sharpless & Co.
 15 lbs. Logwood. } Philadelphia, Pa.
 4 lbs. Ext. Indigo.
 Enter Wool. Boil for 1½ hour. Wash, and done.

Recipe No. 170.

LOGWOOD BLUE ON RAW COTTON.

100 lbs. Cotton (well teased).
 Dissolve 10 lbs. Logwood.
 Enter Cotton. Boil for 1 hour. Sadden with 1½ lbs. Copperas.
 Boil for 15 minutes. Then add in the same tub:
 2 ozs. Violet, 4 B.
 6 ozs. Oxalic acid.
 Boil for 15 minutes, leave to cool in the bath. Then wash, and done.
 This blue will stand fulling.

Recipe No. 171.

WOOD DRAB ON RAW COTTON.

100 lbs. Cotton (well teased).
 Boil 10 lbs. Sumac.
 5 lbs. Logwood. } John M. Sharpless & Co.,
 3 lbs. Hyperic. } Philadelphia, Pa.
 Enter Cotton at boil. Boil for 1 hour, and done.

Recipe No. 172.

FAST WOOD DRAB ON RAW COTTON.

100 lbs. Cotton (well teased).
 Boil 1½ lbs. Hyperic.
 5 lbs. Logwood Extract. } Gifford, Sherman & Innis,
 1 lb. Fustic Extract. } Poughkeepsie Dye Works,
 1 lb. Blue Stone. } New York.
 Enter Cotton at the boil. Boil for 1½ hour. Then sadden with
 1 quart Iron Liquor. Wash, and done.

Recipe No. 173.

BROWN ON RAW COTTON.

100 lbs. Cotton (well teased).
 Boil 20 lbs. Cutch.
 3 lbs. Bhestone.
 3 lbs. Extract Logwood.
 5 lbs. Castiline. } C. Tiers Myers & Co.,
 Philadelphia.
 Enter Cotton at boil. Boil for 1½ hour. Let remain in bath over
 night; raise in the morning with
 2½ lbs. Soda Ash,
 2½ lbs. Chrome.
 at 120° F.; keeping at that temperature for 1 hour.
 C. Tiers Myers & Co. Castiline is a superior and cheaper
 agent for softening than Lard Oil. We advise dyers to try it.

Recipe No. 174.

BLUE ON COTTON.

50 lbs. Yarn.
 Dissolve 3 lbs. Alum.
 1½ lb. Sal Soda.
 4 ozs. Tartaric Acid.
 8 ozs. Cotton Blue, R. C. { P. Monnet & Co., Geneva.
 { Heller & Merz, New York.
 Enter Yarn at 110° F. Turn continually while raising temper-
 ature to 140° F.

Recipe No. 175.

DIAMOND GREEN ON COTTON.

50 lbs. Yarn.
 Lay down over night in 20 lbs. Sumac. Next morning take out
 and wring.
 2d bath.—8 ozs. Diamond Green. { P. Monnet & Co., Geneva.
 { Heller & Merz, New York.
 Enter at 120° F. Turn to shade while raising temperature to
 160° F.

Our Course.

The TEXTILE COLORIST has fairly acquired its present enviable position by strict adherence to one principal line of action, founded on *reliability*. Not one recipe has been published by us which (if directions given were fully carried out) would have failed to reproduce the samples given.

This feature of reliability is one which is secured by a very simple, yet unfulfilling means—whatever dyes we are presented with, by any establishment, however high its character, we invariably submit to our laboratory test, and on the result of that test depends their appearance on our "Monthly Samples" page. Their *positive value* is thus guaranteed by us; for, we take no one's character of his production until we are thus assured. So, the readers of our journal may rely with full confidence on our recipes and their accompanying samples.

It will happen, however, that occasionally failures are the result and complaints are the consequence. Now, we rather like this—for, when complaints come forth, explanation and information are the consequence; and many a one learns more by the failure than perhaps they would have known had they been successful; for, failure draws out investigation and knowledge is thus instructively acquired. We may as well state here that with our recipes we give the firms from whom we obtained the dye-stuffs used in our laboratory tests and, of course, we cannot be accountable for results arising from the use of the dye-stuffs of other manufacturers. It is easy to understand that no two modes of manufacture will produce the same identical shade of color, consequently the results of two different modes must of necessity be unlike in hue.

We derive all the latest and best information on all subjects relating to the mission of our journal from the best authorities of Germany and France whose select articles are correctly translated for our pages, and we freely use the information which is so readily obtained from our well posted brethren of Great Britain. Added to all this we collect the current events of our own country in the

textile industry. But, in no part of our pages can be found an item of extraneous matter—everything is useful—exclusively so.

Thus we make up our TEXTILE COLORIST, and such has been its course—in corroboration of which we point to our past two volumes, and claim the confidence of our patrons, and the continuation of their favor in the future for very many volumes to come.

DEATH OF M. BLONDEAU.—Our esteemed contemporary, the *Moniteur de la Teinture*, of Nov. 5th, brought us the painful intelligence of the death, after a short illness, of M. BLONDEAU, the esteemed proprietor of that journal. The deceased has done much for the propagation of useful information in textile coloring, not alone in his own country, but throughout Europe.

The *Moniteur de la Teinture* is now conducted by MR. J. CHABONNIER, and gives evidence of the fact that the regretted vacancy is ably filled by the new incumbent.

We find in *Le Jacquard* of Nov. 30th, an extended notice of the death, at Verviers, of M. EUGENE MELEN, the inventor of a loom for the weaving of wool fibres; and also of a wool-washing apparatus. M. Melen rose, from a very humble origin, to be the head of what is yet cited as the model wool lavatory. His position is now filled by his only son, M. JOSEPH MELEN, who has been overseer for some years.

NOTES OF THE MONTH.

All communications under this head will meet with due attention, and coloring matters will be fairly treated.

We would call the attention of our readers to the superior article of soap made by the Holbrook Manufacturing Co., of New York, especially their wool scower, used for wool and cloth. Their Fulling Soaps are pure, solid and neutral, and may be used to very great advantage in fulling and finishing.

ALEX. HAHNE, a German chemist, is now introducing a new Brown and Black on wool which is perfectly fast, both to air and to soap. The cost of dyeing these colors, he says, is from $\frac{1}{2}$ to 1 $\frac{1}{2}$ cent. per lb. He is only selling the rights of the process (?) to dyers and mill-owners.

THE MAYNARD CHEMICAL CO., of New York, has a patented apparatus for the Hydration of gases and "Antichlor" which gives unlimited satisfaction. The largest of these machines makes 250 gallons per hour which is equal to one ton of cloth, at a cost for the acid of 5 cents for 100 gallons. No doubt it is a good thing, and worthy of the liberal patronage it is receiving.

LYNN C. TROUTMAN has dissolved his business connection with Mr. F. J. Bird, and is now agent in this city for J. Levinstein, Campbell & Co., New York.

Messrs. E. Schibach & Co's Philadelphia office will be removed, on January 1st, 1881, from 113 to 117 Chestnut St.

W. W. Lee, representative of A. Klipstein, N. Y., will sever

that connection, on the 1st of January, 1881, to represent Andrey-kovics & Dnnk, of Philadelphia.

Messrs. E. Oakes & Co., N. Y. are now introducing T. A. Merritt's new patent gelatine size, which is claimed to be superior to starch, crystal size, gum, or any other product now in the market. It is an animal size; is used in dyeing cotton, or mixed goods, and can be used for the finest as well as lowest grades of stock, as it has the tendency to unite the fabric, and gives strength to the same. It furnishes a superior stiffening and finishing size, and develops and brightens the color. We advise manufacturers and dyers to test it, and will be pleased to hear their opinions.

The Haldane Anti-Friction Compound Lubricator, manufactured by J. Haldane Macdonald, of Philadelphia, for the engine, centrifugal machines, journals and gears, is a preparation of pure graphite, with a very fine lubricating compound, mixed so as to carry the graphite on to the journal, and reduce over-heating and expansion of the metal; thereby preventing the heating, oxidation or corrosion of journals. It never clogs, and for hydro-extractors, as well as for other machinery requiring great speed, is proved to be invaluable.

Messrs. Banning, Bissel & Co. have sold over 3,000,000 lbs. of French extract of dyewood and extract of indigo within the last year.

Messrs. Read, Holliday & Sons, of Huddersfield, England, and New York, are awaiting their American patent for a fast red, produced in two baths without steaming or drying, until finished.

Messrs. E. Oakes & Co.'s (N. Y.) samples of oxymuriate of antimony, muriate of tin, nitro-muriate of tin, nitrate of iron, and pure nitrate of iron we have tested and compared with other manufacturers' products, and found them superior in strength.

We have made only one test of Gelien & Co.'s (Jersey City) Improved Bisulphate of Soda, for bleaching wool, and the result has proved satisfactory. We contemplated producing sample, but on account of pressure of business will have to defer it at present.

The Holbrook Mfg Co's (N. Y.) saponaire is a valuable article for scouring wool.

OUR TABLE.

We take pleasure in acknowledging the receipt of *La Industria Lanera Espanola*, a fortnightly journal devoted to the manufacture and dyeing of wool, whose request for an exchange we gladly accept; at the same time tendering our wishes for a happy New Year to our Spanish contemporary.

QUERIES AND REPLIES.

Under this head we invite all our friends to make their inquiries on every subject connected with dyeing, etc., and we will endeavor to give them such information in answer as they are in need of. We also invite others to give us the aid of their experience in such replies. All will be welcome.

QUERIES.

94.—Can Castellee be used on white cotton and soften, without coloring or staining it? Can it be used in a washing or fulling mill?

Wool extracts are being largely used can you give your readers any process whereby it could be made to feel soft and more like natural wool?
E. G., S. Coventry, Ct.

95.—We are desirous of ascertaining for what purposes molybdenite, or sulphide of molybdenum is used, and what class of people would be likely to use it?

96.—I want a good receipt for coloring cotton blue and slate?

J. B.

97.—What is meant by a *turn*; or of what does a turn consist?
T.

98.—What is the number of pounds in a kilo? How many grams in an ounce?
NEW SUBSCRIBER.

ANSWERS.

95.—Molybden. No. 96 (95 86) was discovered by Sebe in 1778, while investigating Plumbago.

Molybdenite is used in producing a blue oxide, and acts as a reagent of phosphoric acid, molybden and ammonia.

96.—J. B. does not state whether for loose cotton or yarn. For the former we refer him to Recipe No. 135, October number, and for late to the May No. 77, and June No. 89, all of 1880.

97.—A *turn* is simply a moving of the sticks on which the yarn is hung in the bath tub and turning over the same.

98.—A kilogram (kilo) contains 2 pounds and a $\frac{1}{2}$ (nearly) A gramme, or gram, is the twenty-fourth part of an ounce.

CORRESPONDENCE.

In this department of the TEXTILE COLORIST we propose to publish all letters pertaining to the business of dyeing, bleaching, etc. But we wish to be distinctly understood that we will not hold ourselves responsible for any opinions set forth by writers.

DEAR SIR:—In your November issue (No. 23) of this year, you give some facts and opinions about "Spontaneous Combustion of Silks." I believe that there is nothing mysterious about it; for the facts and causes are very well known to the oldest dyers in Lyons (France).

Over twenty-five years ago a large fire occurred in the very important dyeing-house of Gninon aine in Lyons, from a large quantity of silks. From inquiries made by experts, as well as opinions expressed at the time, the cause of the fire was attributed to the oily material used on the silks, either to weight them or to produce that softness to the touch which is so desirable when metallic mordants, such as tin and iron, are used, as was the case when *Blue Raymond* and *Bleus de France* were in vogue; and used to-day for the Blacks; especially on weighted silks.

Oil was also used on raw silk, during the throwing of it (moulinage). This was to give weight in making into *trams* and *organzines*, by the *piqueurs d'onces* of that period, to dissemble and conceal their robberies. This being the nick-name given to them—meaning pickers off by ounces.

Yours,

P. PRUNIER.

New York, December, 1880.

EDITOR TEXTILE COLORIST:—In your last issue, regarding chlorozone and ozone as a printing oxidizer, you observe, editorially,

that *autozone* does not exist. Allow me to remark that this assumption contradicts scientific authorities as *Shoenbein*, *Bequerel*, *Howzen*, and others. It also sets aside the fact that oxygen has its negative, as well as its positive, constituents—ozone and autozone—like electricity, which enters into the composition of ozone.

This last fact you may personally verify; plunge the ends of two fingers in chlorozone, and rub them against each other. A peculiar heat and smell will generate from this friction, and, with the electric character, a special temperature be located between your fingers, though not absolutely tangible.

On account of its neutral character, the existence of autozone cannot be denied, since all the elements of nature have a quality or a double constituency, more or less visible.

Yours truly,

E. L.

Dyeing.

BY PROF. J. F. ELSOM.

We have now arrived at that stage of our talks that we must rely principally upon what others have said and written upon the general subject of dyeing, especially as relates to the American system as practiced at the present day. Speaking of the colors in their order of importance, according to competent authorities we speak first of reds, the most important of which are obtained from cochineal and madder, the former being used for woolen and the latter for cotton goods. These are both old colors, having attained their present state of perfection only by very slow degrees; they are deep and brilliant, and, as far as regards permanence, hold a prominent position among all dyes known to the chemist or artisan. I will be pardoned if I attempt to explain some of the processes employed, and all readers who detect anything which they already know will consider that that particular portion will benefit others if not a particular individual. These processes are all instructive as illustrating the diversity of treatment required by different fibres and coloring materials.

Speaking of red upon wool from cochineal, let it be assumed that the shade of red required is a fine scarlet, such as is worn by fashionable ladies, and that the woolen is of the finest quality possible. The first thing to be considered is to rid the cloth of all adventitious substances, which are naturally transmitted to it in the intricate processes of manufacture. This is absolutely indispensable in order to avoid unevenness in the shade, the slightest deviation from which will be very apparent with fine goods of this delicate shade. This is done by the process called bleaching, an industry fast taking a stand as being entirely separate and distinct from all others, but which will receive attention in the future.

The only materials required to produce a fast scarlet upon wool are oxide of tin and the coloring matter of cochineal. Nevertheless, much practical skill is required to bring them properly into contact. After the cloth is thoroughly cleaned, and before being thoroughly dry from its last washing, it is mordanted by boiling in a solution of salt of tin, with or without cream of tartar. The parts of the boilers not in actual contact with the fire are frequently constructed of pure block tin; or, at least all parts out of water should be of this metal, or else protected by wood, else the dyeing vessel should be constructed entirely of wood and heated by steam pipes; for if the cloth containing the acid solution of tin comes in contact with the copper or brays surface it acquires a stain which afterwards dyes up an impure color.

What takes place in the course of boiling is that eventually a certain portion of tin, probably in the state of stannic oxide, becomes fixed upon, or within, the fibres of the wood, and this in a perfectly uniform manner; the tin not in intimate combination with the wood, or held merely by capillary attraction, is washed off by the water before the cloth is brought into contact with the coloring matter.

After the foregoing has been found satisfactory to the practical operator, the mordanted cloth is brought into a boiler containing finely ground cochineal diffused through a sufficient quantity of water, to which it is usual to add some more tin mordant and tartar; the cloth is continually turned in order to prevent folds or creases from interfering with the free access of the dye to all parts of it. The contents of the boiler are heated to the boiling point, and in half an hour or so the liquid becomes nearly colorless, and the cloth is found to have taken a brilliant red color.

This will furnish the general reader with a general view of the procedure usually followed, as well as to illustrate the principles involved with regard to numerous other dyes than cochineal. To give the reader a further idea of certain operations practiced in the use of that color (and the description applies with more or less force to all others), the following particulars may be noted:

The tin mordant used for scarlet on wool has, according to research, been known for upwards of two hundred years. In view of this, it would be very reasonable to suppose that the exact kind and quantity of tin solution to be used would have been settled; but this is far from being correct, for at the present time there exists the greatest diversity of opinion among practical dyers on this very point. The two salts of tin, met with in commerce, designated by chemists stannous and stannic chlorides, have received various names from dyers. Crystallized stannous chloride is generally recognized as "tin crystal," the solution of the same as muriate of tin. A single muriate and double muriate of tin are also distinguished, the difference being the degree of concentration; but among some dyers I have met, the double muriate of tin is the name given to a solution of stannic chloride, elsewhere called bichloride of tin, and a good deal of confusion is sometimes caused by the various uses of the trivial names of the solution of tin.

Experience teaches that there are scarcely two dyeing establishments in the world in exactly the same condition with regard to either water and air, or apparatus, or quality of materials; also that the nature and quantities of drugs, mordants, and dye-stuffs used, and the duration and temperatures of the operations which secure admirable results in one place, are altogether unsuitable in another. It is, however, by far the greater part of the variations introduced by practical dyers that are not really founded upon necessity; thus, although the best colors can be obtained by the use of simple tin solution manufactured on the large scale, in nine cases out of ten the operative dyer of scarlet insists upon preparing his own solution; precluding that he employs special methods and preparations, without which it would never be fit for use, and hence a countless number of those solutions are in use. This is all well enough, for, doubtless, everyone has a certain process of manipulation peculiar to himself, which he honestly considers the best.

The solution used by dyers for the scarlet and for many other colors upon wool, silks and cotton, are commonly called spirits, or "tin spirits," a name which is very old, and appears to have originated in the use of nitric and hydrochloric acids to dissolve the tin, which acids were formerly, and are even at present, called spirits of nitre and spirits of salts. One solution which is a favorite, from the ease with which the metal goes to the wool, is the so-called nitrate of

tin—sometimes called "bowl-spirits" from being prepared in an earthenware bowl—made by dissolving this metallic tin in nitric acid moderately strong. This is an operation requiring great care and some experience to prevent the formation of insoluble metastannic acid, the tin is added by small portions and gradually, so that the acid does not become hot, the solution takes place very quietly, inodorous nitrous oxide is evolved, and ammonia is formed, if the tin be added too rapidly to the acid, red flames of nitrous oxide are formed, or evolved, the liquid boils up, becomes thick from separation of metastannic acid, and is utterly useless as a mordant. This so-called nitrate of tin is a very unstable compound, decomposing spontaneously in a few days, so that it has to be prepared just as wanted; it is, therefore, not an article of commerce, the other very numerous tin spirits may be said to be solutions of tin in nitric and hydrochloric acid, but the latter acid is sometimes replaced by the chlorides of sodium and ammonium, the resulting mordant being essentially a stannic chloride mixed with stannous chloride. Closely woven and loose woolen fabrics, such as yarn and flannel, require different tin mordants, as some mordants are more quickly decomposed than others. The result of using an easily decomposable mordant such as the nitrate of tin upon closely woven cloth would be the formation of a deposit upon the external surface of the fabric, the interior being unaffected. For such cloth, therefore, a tin spirit which is only slowly decomposed, such as the muriate alone or mixed with tartar, must be chosen, so as to allow of a tolerably thorough saturation of the cloth before the breaking up during the boilage. Here it may be observed that good, thick, and finely woven cloth which is dyed in the piece, is hardly ever completely dyed through; this can be easily proven by cutting through the cloth with a sharp knife, when the interior will be seen as almost white, generally much paler than the exterior. Hence the preference given to cloth made with yarn dyed before weaving, the colors of which do not fade so easily as piece dyed goods. Imperfections in the dyeing of the latter can be, however, be reduced to a minimum, and in dark goods is hardly discernable.

(To be Continued.)

A NEW SILK WORM FOUND IN NEVADA.—It is understood that a new variety of silk worm has been discovered accidentally in the mountains of Nevada. Naturalists pronounce the worms *bombyx quercicus*. It is a silk worm that feeds on oak leaves, and is largely used in China. It makes several broods in a year, and its silk has peculiar qualities. The fibre is strong. All other silk worms in emerging from the cocoon cut a hole for exit, which, by breaking the continuity of the thread in unwinding, renders it of little value. The *bombyx quercicus* pushes aside the threads, instead of cutting them, and the cocoon is as valuable as others reserved in ordinary kinds for spinning by killing the contained worm. The new silk worm is harder than the old. It is raised in the open air, needing neither care nor shelter.—*Boston Herald*.

FRANKFORT EXHIBITION.—The wealthy and industrial city of Frankfort-on-the-main, Germany, is organizing an exhibition of patented articles, or new inventions of value. Foreign countries are invited to contribute to this select Fair.

✂ We will pay SEVENTY-FIVE cents a copy for our first number, January, 1879. ✂

Process For Imparting a Metallic Glaze to Filaments.

PATENTED BY POIRAIN & ROSENSTIEHL.

This process consists in coating the textile with a sulphurous substance containing a metallic cast. The fibre is impregnated with a liquor containing in solution metallic salts; immersion imparts the shade and glaze of the metals. After this immersion the fabric is exposed to an atmosphere containing sulphuretted hydrogen, to fix the coating and develop the metallic color.

Improved Process For Cotton Dyeing.

This is a new method of dyeing in black cotton fabrics and yarns, or wool tissues. A dyeing bath is prepared with a solution of logwood-extract and quercitron bark. (The proportions vary according to the shade desired.) Add to this bath a solution of sesquioxide of chrome and a solution of copper, either sulphate, chloride, or nitrate. [Acetate of chrome answers as well.] The goods being dipped in the bath and dyed, as usual, are then spread out and dried. Then the black is fixed in passing the fabric through an alkaline solution.

It was Mr. S. Clare, of Greenfield (Yorkshire, England), who first introduced this process, and who also modified it, respecting the black on cotton, using extract of logwood with a yellow coloring matter in bark, such as quercitron (as above mentioned), and in adding a solution of chrome alum to one of sulphate of chrome, of nitrate, or of acetate of copper. The bath can be dispensed with; the chrome alum in some cases.

The pieces are then treated as first explained. If the fabric is velvet, it should be placed in a sieve while in the bath, and passed afterward in the hydro-extractor, to remove the superfluous liquor. The pieces are then spread, dried, and passed through a solution of soda to culven the black. Satins, or other like goods, must be calendered, spread and dried after immersion. It is, however, not absolutely necessary that the pieces be dried before going in the soda solution to produce the black, though it is better to calender right from the bath, and have it dried before putting it in the alkaline bath.—*Mou. de la Teinture.*

The Analysis and Matching of Colors.

FROM A NORTHERN CORRESPONDENT.

By the term analysis we generally mean the separation of any compound or mixture into its several or elemental parts. There are two kinds of analysis—the analysis of chemistry, whereby each compound is torn asunder, and its constituent parts laid bare; and the analysis of the eye, whereby the elemental parts of a color are traced in the mixture or pattern before you, by reflection on the optic nerves.

The very basis of dyeing is the capability of taking a pattern and being able to point out its constituent colors; for how can you try to imitate a pattern unless you know the colors which the pattern contains? In chemistry, analysis always goes before synthesis, and so must it do in dyeing. A system of blind, hap-hazard filling the kettle never did, nor never will, bring out good and correct imitations of the pattern; and it is only a system of folly, a waste of stuff, and a disgrace on the performer when such happens. How

many scores are there in the hat trade to-day in England who, if a new color were brought to them, would have to bow the bended knee of humility? And what is the cause of this? Is there no reason? Yes; the reason lies here. They have never studied the composition of colors, they do not know the $x + x = 2x$, nor that $x + y = xy$. They know that they have been told to use a certain amount of a certain thing for the production of a definite color, and when that is done their foresight is exhausted. That man is like the child who has been taught that certain letters spell a certain word. He has to learn the A B C of dyeing. He cannot compose a color because he knows not the elements. I may be told that the well-educated school-boy is not certain to put his letters aright in hard words, any more than the studied dyer is able to produce all colors at first trial. That is readily granted; for, with all our knowledge, all our science, we are at times liable to stumble on the rock of mistakes. But how much more liable is he who sails without compass, who steers without reason, and who guides without judgment? I trust I have said enough to show that the analysis of colors and the composition of mixtures is the very basis and foundation of dyeing. Help may be found in this direction by the aid of the spectrum, which contains all the shades of colors, by the mixture of two of the elements, beginning at one end with red and going through the various grades, shades, and compositions in the following order: red, orange, yellow, green, blue, indigo, and violet. Here the student will find the three primary colors, and colors formed when any two of these are brought together. As in many cases it is necessary that all three of the primary colors must be used, the student will have to bring practice to his aid, and let his judgment guide him. In some cases it is possible of forming a new color by the addition of the third primary color when the other two are joined, as the following examples will show: When cudbear, camwood, or sandarwood is added to a green hat, the color is turned into a bronze; when extracts of indigo, blue aniline, or green aniline is added to a brown hat, the color begins to assume an olive tone, and in proportion to the amount of blue coloring-matter put into the bath, so will the olive tone be. If sufficient be put in it will ultimately arrive at bronze, thus showing that a bronze color consists of all the three primary colors, the relative proportions to be guided by the shade of bronze required. In aiming at any color it is always an advantage to be able to strike a peculiar shade, when one is wanted, by the aid of the mordants rather than by any coloring-matter or dye-stuff. I know of no more convincing proof of this axiom than in the dyeing of olives and prunes. In the olive color the peculiar green shade is struck by the aid of copperas, thus avoiding the difficulty of right shading by the aid of blue coloring-matter. Most of your readers are aware that a prune color has a red bottom, with a pale, curious blue bloom upon it. I have tried various ways, and have known others to try, to imitate this with coloring-matter alone, but never knew any one to thoroughly succeed. When the shade was procured, it was inert and dead—void of that brilliancy which is so necessary in a beaver hat. By the aid of a composition of tin and iron mordants it is easily raised, and I must say, when it is thoroughly managed, that prune is one of the nicest, brightest, and loveliest colors that is taking the lead in

the hat trade of England to-day. It is always safest in aiming at any color to make sure that you have a good bottom; that your hat is full of the *base* of the color which you intend to place in the hat. This is of essential importance, for unless you get a good base you cannot reasonably expect to get a solid superstructure. Here, again, the knowledge of how colors are built up is to the front, for you cannot know what base to put on unless you know of what the color consists. It is useless trying to finish or top the color unless you know your base is right, and this will be readily seen when you are dyeing to a green sample. Let us take beaver brown color as an example. With a really good drab bottom, all you have got to do is to get the requisite amount of brown coloring-matter on the hat, whereas if you have not a good drab bottom the brown color when inserted will look of a raw red nature, and will compare unfavorably with the soft, delicate, lovely brown which is so desirable in a fine fur hat. Take, again, the color of prune. If you have a really good maroon bottom you can readily get the peculiar blue bloom on the hat, but if your bottom is empty, the color, when finished, will be of a very low order, and many times far from the desired shade. The same may also be said of brown, garnet, peach, and plum colors, all of which, in their own way or direction, require a substantial base.—*Hatters' Gazette*.

Process by Which to Obtain a Rapid and Uniform Mordanting on Wool.

BY MR. THEO. DAUX.

After the ordinary preparations of the woolsens before dyeing, a cold mordant bath (acid or otherwise according to the desired color shades) is made, and the tissue dipped in it for a thoroughly cold saturation. It is then subjected to a complete extraction of the liquid, through the hydro-extractor, and immediately calendered on hot cylinders. The dry heat diffuses and fixes the fibre in the mordanting elements.

After this drying operation, it goes directly into the boiling coloring kettle, to be worked and finished as usual.

Merinos, cashmeres, cottons and fine woolen goods can be dispatched far quicker and better through this simple and effective process of rapid fixing.

Of course, the drying process, which is the important part of this improvement, must be proportioned to the thickness of the tissue, incorporating the mordants only through a proper heat.

[Chemically this method for impregnating mordant is correct.—Ed.]

BLOOD albumen is not equal to egg albumen, but it can be produced cheaper and be clarified sufficiently to satisfy the printer in most cases. The blood from slaughter-houses is collected as clear as possible. After 30 or 40 minutes coagulation the blood settles so that the serum is on the top of the coloring matter. Then it can be collected through an overflowing pipe, similar to that of a bath tub, with the difference that it can be made to reach the level of the colorless substances, which, filtered and evaporated, furnishes the blood albumen.

Comparative Tables.

DEGREES OF TWADDLE AND REAUME (French).

The following tables, showing the comparison between different hydrometer rates and thermometer scales, will be found useful in the warehouse and dyeworks:—

Twaddle.	Reaume.	Twaddle.	Reaume.	Twaddle.	Reaume.	Twaddle.	Reaume.
1	3	30	20	68	39	127	59
2	1½	32	21	72	40½	131	60½
3	2½	34	22	74	41	134	61
4	3	36	23½	76	42	138	62
5	3½	37	24½	79	43	142	63½
6	4	39	25	81	43½	146	64½
7	5	41	26	84	45	147	64½
8	6	43	27	86	45½	...	...
10	7½	45	28	89	46½	...	...
11	8	47	29	92	48	...	...
13	9½	49	30	95	49	...	...
14	10	49	30	95	49	...	...
16	11½	51	31	98	50	...	...
17	12	53	32	99	51	...	...
19	13½	55	32½	104	52	...	...
20	14	58	34½	107	53	...	...
22	15	60	35	110	54	...	...
24	16½	62	36	114	55½	...	...
25	17	64	37	117	56½	...	...
26	18	66	37½	120	57	...	...
27	19½	67	38½	124	58½	...	...

COMPARATIVE THERMOMETER SCALES.

Celsius Centigrade.	Reaumur.	Fahrenheit.
+ 100°	+ 80°	+ 212°
—	+ 75	+ 201
+ 90	+ 72	+ 194
+ 80	+ 64	+ 176
+ 70	+ 56	+ 158
+ 60	+ 48	+ 140
+ 50	+ 40	+ 122
+ 40	+ 32	+ 104
+ 30	+ 24	+ 86
+ 20	+ 16	+ 68
+ 10	+ 8	+ 50
0	0	+ 32
— 10	— 8	+ 14
— 20	— 16	— 4
— 30	— 24	— 22
— 35	— 28	— 26
— 40	— 32	— 40
— 50	— 40	— 58

To reduce degrees of Fahrenheit into degrees of Reaumur, multiply the difference between 32, and the degrees given of Fahrenheit by four, and divide by nine.—*Textile Manufacturer, Eng.*

Pyrolignite of Iron (Black Lignor).

M. A. KIELMEYER (in the *Polytechnische Zeitung*).

Pyroligneous acid and pyrolignite of iron are substances not usually manufactured for the market, and printers are obliged, therefore, very often to prepare the latter themselves, by the double decomposition of sulphate of iron (copperas) with acetate of lead. The iron liquor so prepared is easily oxidized, and the more it is concentrated the more complete is the precipitation of the sulphuric acid in the copperas by the acetate of lead. The great variation in the composition of the commercial copperas makes it difficult to obtain a reliable mordant, as old colorists well know, especially when it is desired to produce delicate violet shades. There is now no well-conducted printing establishment in which the preference is not

given, in printing violets, to other and more expensive mordants than the common acetate of iron. In fact, wood distillation is seldom conducted with regularity and continuity, and the pyroligneous acetic acid thus obtained only gives a black liquor, which not only does not contain iron in constant quantity, but contains it in the form of protoxide, and moreover is not free of the sulphate. These two defects are of great importance when it is necessary to employ the iron mordant in printing violets, as may be seen from the following considerations:—With a printed iron mordant, saturated as it ought to be, and which, either by steaming or by ageing, has been fully developed, and has been passed through chalk, it is right to expect that it offers the highest degree of oxydation at which iron can be fixed on the fabric. In spite of all this, it may easily be proved that it is not a hydrate of ferric oxide, since, if a pattern of this buff is passed through a solution of phosphate of soda, it assumes at first a greenish yellow color, and only after a few minutes, and under the influence of light, is the red-brown coloration of phosphate of ferric oxide developed. If a pattern of this printed mordant is dyed with alizarine the resulting violet is common in appearance, and altogether unsatisfactory.

On the other hand, if the iron mordant is not enough oxydised on the fabric the resulting violet is dull and not perfect. In order to produce a bright violet with alizarine, it is necessary that the iron fixed on the fibre should be between the peroxide and protoxide of iron. In order to produce, under the conditions that obtain in a print-works, this compound in a constant and reliable manner, it is necessary to work with a protoxide salt, quite free from peroxide, to ensure a fixed and constant starting point. Therefore, with all confidence the pyrolignite of iron may be used, the tarry matters it contains preventing the oxydation of the liquor when exposed to air, since, by forming a skin at the top, the action of air on the mordant is prevented. In almost all printworks it is prescribed to boil the iron mordant with white arsenic; part of this goes into the solution, and the tarry matters are precipitated in a solid form. If it be admitted that the boiling with arsenic has for its object to obtain arsenic acid on the cloth afterwards, then it would be useless, as the general practice is to dung the oxydised violet pieces by a passage through arseniate of soda, but this is not the case. It is much more likely that the boiling with white arsenic has the result of guaranteeing the iron against the action of the air, and to regulate the oxydation on the cotton in order that it does not go beyond a certain degree. Another important point is that the proportion of the iron salt in the mordant is constant, because a mere 1 per cent. of difference is easily observed on the colored pieces. On the other hand, an excess of iron in the mordant brings forth disagreeable effects in the working. These circumstances may be well studied when working with madder extract, or artificial alizarine, for obtaining the violets by printing in one operation both the coloring and the mordant. The more iron the color contains less pure is the violet; after steaming and soaping, and with a great excess of iron, almost a cachou tone may be obtained. The same takes place in dyeing, when there is an excess of iron in the mordant, that is, more iron than is necessary to fix the alizarine, the iron fixes itself on the fibre and adds its buff tone to the violet, rendering the latter

less bright in exactly the same way that hydrate of alumina, when in excess of the coloring matter, is fixed on the cloth, and adds its whiteness to the red and diminishes its brilliancy. This question, however, has lost some of its importance, recently at all events, since the fast violets previously dyed with alizarine, or garancine, can be brought to a violet by passing the goods through a solution of aniline violet in water.

The above will show the importance of having a uniform method of preparing the pyrolignite of iron to be used in printing. The following method has been long in use:—The pyroligneous (wood) acid is put into wooden tubs in a place where a constant moderate temperature may be relied on, and an excess of iron filings are added, and stirred every now and then, when the whole is left to rest for a few weeks; this gives a saturated iron solution. This method of preparation is certainly very simple, but in these days of the division of labor it seems preferable to get the iron liquor from the works which are engaged with the production of wood acid. In commerce the iron liquors show from 15° to 30° Twaddle, but these degrees are no sure guide to form an idea of their real strength, since the tar that contaminates the mordant has an influence in showing a higher degree, and it may be that a solution at 30° Tw. contains less iron than one showing only 15°. The black iron liquor at 30° Tw. is used by woolen dyers for black dyeing. For printing it is used from 15° to 30° Tw. It must show a deep green color, and not give any precipitate with chloride of barium, that is, it must show no trace of sulphate of iron, which in some cases is added to Twaddle a higher degree. To be quite certain of its quality, it is best to test it quantitatively in the following way:—Evaporate about 10z. of the black liquor in a large porcelain capsule, on a gas burner. A black mass is obtained, which is wetted with pure nitric acid at 45° Be, and heated till red hot to destroy the organic substances; repeat the wetting with nitric acid two or three times, and heat again; finally, heat strongly, when only oxide of iron ought to be found in the capsule. This is weighed, and the percentage calculated. Amongst a large number of analyses made by the writer, the worst sample contained 0.9 per cent. protoxide of iron, and showed 13° Be, and the best 5½ per cent., and 12° Be.—*Textile Manufacturer, Eng.*

The Action of Light.

The members of the Huddersfield Dyers' Scientific Society recently held their first meeting of the season 1880-81, when, accepting an invitation from Mr. D. Dawson, the president, they visited his laboratory at Millsbridge, where he read a paper on the "Action of Light," and illustrated it by some novel experiments showing the effect of light upon such coloring matters as magenta, chrysoidine, and aniline black. In commencing his paper Mr. Dawson said "he thought it might be of interest to make a few remarks on the action of light on bodies. If the subject were reversed and stated in this manner—the action of bodies upon light—we should be landed upon a subject so full of intricacies and difficulties, that I should be totally unable to explain to you the many phenomena which it would involve. I only just need to mention some of these phenomena to make plain what I mean, viz., transmission of light through transparent substances, reflection from bright surfaces, refraction, decomposition, and polarisation of light, which all belong to the province of optics. Now, the action of light upon bodies has quite another meaning. If by it we mean its power to aid in the building up or decomposition of matter; in short, its power to act chemically. In the vegetable kingdom we see being built up vegetable forms on a stupendous scale, and this process of construction is in some occult

way dependent on solar light, the relative importance of which is not very clear. It is, however, well established that vegetation cannot flourish without light. Now what is the general chemical effect in all these natural constructive operations in which light plays an important part? Chemistry demonstrates that it is one of fixation of carbon, hydrogen, and nitrogen chiefly. Compounds of those are taken as the crude building materials, and are broken up in the constructive process, and the elements fixed in the edifice, so to speak, in the form of other compounds of very complex characters. Indeed, so complex are the natural organic compounds, that only in comparatively rare instances had the chemist been able synthetically to construct them, notwithstanding the vast feats of synthesis which have been performed since a more accurate insight into the constitution of bodies has been gained. These crude building materials of nature, viz., carbonic acid, water, and ammonia, require for their breaking up a most stupendous chemical force ere their carbon, hydrogen, and nitrogen are fixed in the plant in the form of other combinations. To illustrate the force required for this work, which is apparent at once to one acquainted with thermal chemistry, let us take, for example, the most abundant material required in building up all organisms, viz., carbonic acid, and try to form some idea of the force which binds together the two elements in this compound. If we take a great many of the metallic oxides, and submit them to the most violent treatment out of contact with other reagents, such is the tenacity with which the oxygen and metal are held together, that they undergo no change whatever; but if heated in presence of carbonic oxide, then they are robbed of their oxygen easily, the carbon having a still stronger affinity for oxygen than the metals themselves. Most of the metallurgical operations in which metals are extracted from their ores are based upon this strong affinity of carbon for oxygen; and yet strong as this is, it is split up easily under the threefold influence of vitality and light and heat. During the process of growth of a plant the carbon is fixed in its structure, and part of the oxygen is sent back into the atmosphere.

"Now, it is strictly according to law that the force absorbed in bringing about chemical changes, whether direct or indirect, the same force will be given off in the contrary process of restoring the matter to its original form. Therefore when we burn organic matter, let us say wood, coal, etc., the heat given off represents exactly that absorbed during its growth, for the matter in combustion is returned to the same state in which it existed when the plant seized it as nourishment. This fact again furnishes an excellent idea of the forces which operate in these natural phenomena. It has somewhere been stated by a writer that to-day we are running our steam engines with solar light and heat which has been bottled up for us in the earth for millions of years. This is absolutely true. After these few remarks on the action of light in the natural world, which goes on quite independently of man's inventions and operations, and indeed went on long before man existed, let us consider what little use, as yet, man has made of this subtle, yet powerful agent. The most conspicuous application of light to the purpose of art is in photography. Nothing in the whole range of applications of the natural forces to the purposes of art can excel the results obtained by photography for exactness and accuracy. Let us illustrate this by taking a photograph; and at the same time I will endeavor to explain briefly the process. Here is a solution of gun cotton in ether. This solution is called by photographers collodion. I take one of these plates and pour this solution over it in such a manner that it flows as quickly as possible over the whole surface of the plate, and the excess is allowed to drip off at one corner back into the bottle, during which the plate must be tilted to

and fro, so as to avoid the formation of streaks. The production of an uniform film on the plate is a point of great importance. As ether is a substance extremely volatile, it quickly evaporates and leaves the gun cotton as a tough film adhering firmly to the plate. Now besides gun cotton there is also a small quantity of iodide of potassium dissolved in the collodion, so that this substance will also be left on evaporation of the ether thoroughly incorporated with the film. This being done, the plate is next immersed in a bath of nitrate of silver. The merest tyro in chemistry will now be able to explain what will take place between the iodide of potassium and nitrate of silver. The elements simply transpose themselves so as to form iodide of silver which remains on the plate, and nitrate of potassium, which washes into the bath. Whilst this plate sleeps a few moments in the bath, so as to ensure a complete reaction between the substances, we will just focus an object in the camera. You see here an inverted image of the object on the ground glass. Now I will bring the prepared plate in a dark slide, which is designed to protect it from exposure to light during its passage to and from the camera. I place the slide in the camera, and the plate which it contains is now in the exact place where the image was seen on the ground glass. I now draw out the door, and allow light to fall upon it. A few seconds is sufficient in good light, and the action has now taken place. The parts which have been exposed to light from the object have been affected, while those kept dark remain unaffected. The exposed and unexposed parts have now different chemical properties, as is proved by the treatment which I am about to submit the plate to, which consists in the first place in pouring on it in the dark room a solution of sulphate of iron, when we see in those parts which have been exposed to light a rapid reduction of the silver compound to the metallic state. After washing away the excess of sulphate of iron, a solution of cyanide of potassium is then poured over the plate, leaving the silver as the paint, so to speak, of the picture. Here is the picture. Although not perfect in a photographic point of view, it has nevertheless illustrated my point; that is to say, the action of light on bodies. But, as might be supposed, the action of light is not by any means restricted to silver compounds. Indeed, in the photographic art itself, which at one time knew only of silver compounds as light alterable substances, there has been in recent times other substances introduced in substitution of silver compounds. For instance, in the carbon printing process, whereby enlargements to very large sizes can be obtained, chromic acid is the light alterable substance employed.

"Now, as dyers, in whose hands this substance, as bichrome of potassium, is so largely and often found, I deem it well worth your while to pay attention to this peculiar property of chromic acid, as in some cases it may have some bearing upon your art. I will mention one fact to show you why I think so. At one time I made many attempts to fix aniline black on cloth, and I succeeded to that extent that I think it might be usefully adopted in cases where the shade would be suitable. My first process was to work the cloth in a somewhat strong bichrome black, acidulated with sulphuric acid. One bright summer's day, some of the cloth which had been chromed as indicated was thrown up out of doors. After a time I found the light had acted upon it powerfully, the exposed parts having darkened considerably. Now here was an observation which was destined to prove the nature of the change which the chromic had undergone, for my next operation proved that there had been a reduction of the chromic acid, because those parts which the sun's rays had acted upon did not develop the aniline black to the same extent. It is obvious the chromic acid had yielded some of its oxygen. The photographer and

the dyer stand, in respect to the influence of light on their respective arts, in quite dissimilar positions. The photographer makes use of light as a constructive agent; it is his main agent to obtain the results desired. Now the dyer has to consider the action of light in quite a different aspect. Instead of serving him as it does the photographer—as an aid to obtain the results aimed at—he regards light as the great destroyer of his work. Indeed, light in one sense, whilst being the friend and ally of the photographer, is the great enemy to the colors fixed by the dyer. No less on this account should the dyer make himself acquainted with its power of attacking his work; for it is one of the chief duties of a general to study the forces which can militate against him, in order that he may bring a superior force to successfully combat the enemy. The dyer, then, has to form a proper estimate of the attacking force of light upon his colors. This can only be done by actual experiment, by exposing them under proper conditions. Throughout the whole range of coloring matters used by the dyer we find a very wide series of gradations in respect to resistance of the decomposing action of light; some colors being attacked in a few hours, while others can withstand its action as many years. This is known not only to dyers, but generally, hence we have the common expression—'Don't have that color, because it fades.' But since the introduction of such a great variety of new coloring matters into the art, the public will be puzzled in forming a judgment as to the fugitiveness or permanency of certain shades, and they will often be quite wrong in their conclusions; for the same shade will many times vary in regard to fastness, because it is often produced by the use of totally different coloring matters, each having its own specific power to resist the action of light. But the dyer should be so well acquainted with all colors in respect to light resistance, that he may select the most suitable for special purposes. Where it is of the utmost importance that a permanent color should be used, then of course he must have recourse to one of that class, although in other respects it might be disadvantageous. For instance, it might lack the desired brilliancy, facility of fixing itself to the fibre, or be somewhat detrimental to the material. Although the resource of coloring matters is now so rich, chiefly by the addition of new coloring matters obtained by comparatively recent researches, the dyer is yet compelled in a host of cases to use fugitive colors where more permanent ones would be far better, because the circumstance in the dyeing operations and the properties of the colors are such that there is sometimes but little choice left as to which must be used. Those circumstances have to be met, even if the color selected be somewhat fugitive.

"For instance: how many colors are all that could be desired as regards woolen dyeing? But when it is a question of bringing cotton up to the same shade in the same fabric, the dyer has to hunt for another color to accomplish the end, and be often fails to find one in which are combined all the properties required for the purpose. Well, then, he has only to do his best, and the public will have to be satisfied with best attainable. The requirements of fashion are so great that it is no wonder the dyer still lacks the means of completely meeting them satisfactorily. But perhaps on this very account the art is more interesting, as it furnishes a field for constant experiment with a view to remove ever-recurring difficulties; and, with the aid of the chemist, the dyer has from time to time removed many obstacles, which seemed almost insurmountable. Let us hope, then, by perseverance and application he will always be able to cope with them. The technical schools which are springing up around us, combined with more extended scientific knowledge, will give him immense assistance in his attempts to find new applications for coloring

matters, or improved methods of using them. I have now an observation to lay before you which further illustrates the action of light. I have mentioned the alteration of chromic acid in cloth by the influence of the sun's rays. I think I established the fact that the alteration was due to the reduction of chromic acid. Now it occurred to me that if chromic acid is rendered more deoxidizable under the influence of strong sunlight, or, what is the same thing, becomes a more powerful oxidizer, it might be made to act upon matters which are capable by oxidation of developing a coloring matter, at an accelerated rate, with the assistance of solar light. That the rate of action is so accelerated I will show you a plain proof. It is evident that this accelerated action furnishes the elements for taking a photograph. Here are several formed by the fixation of aniline black on paper by the aid of sun light. I have now only to show you three colors which I have exposed about fourteen days. I have exposed them in a novel manner. I have placed them under a photographic negative. I have selected two of the most fugitive colors, viz., magenta and crysoidine; the other is an azo compound, and far more permanent. You observe the magenta and crysoidine have given photographs, although very indistinct, whilst the azo compound has not yielded to the action of the light."—*Eng. Textile Manufacturer.*

On the History of the Artificial Preparation of Indigo.

BY CARL SCHORLEMMER, F. R. S.

One of the most brilliant discoveries which lately has been made is that of the synthesis of indigo, the Indian color which is mentioned by Dioscorides and Pliny, as well as by the Arabians. It was, however, only after the discovery of the sea passage to India that it became generally known in Europe; but its use as a dye was greatly retarded by the opposition it met with from the large vested interests of the cultivators of woad, *Isatis tinctoria*, the European indigo plant. The English, French, and several German governments were induced by the growers of woad to promulgate severe enactments against it. Thus Henry IV. of France issued an edict condemning to death anyone who used that pernicious drug called "Devil's Food." The employment of woad was, however, gradually superseded by that of indigo; and as soon as organic chemistry had advanced far enough, chemists began to examine this important coloring matter, which was first obtained in the pure state by O'Brien, who states in his treatise "On Calico Printing," 1789, that on heating indigo the coloring matter volatilizes, forming a purple vapor, which condenses as a blue powder, whilst the impurities of the commercial product are left behind. Indigo-blue, or indigotin, as the pure compound is called, was afterwards analyzed by several chemists, who found that its most simple formula is $C_{16}H_{10}NO$, which was subsequently doubted for several reasons.

The literature of the chemistry of indigo is very large. Of the numerous researches I can here mention only those bearing directly on my subject.

In 1840, Fritzsche found that on distilling indigo with potash a basic oil is produced, which he called *Aniline*, $C_{10}H_7N$, from anil, "by which name the Portuguese introduced indigo first into Europe. The word is Arabic, and means simply the blue." In the following year he obtained, by boiling indigo with caustic soda solution and manganese peroxide, a compound which he called anthranilic acid, and which is now known as *orthanilic-acetic acid*, $C_8H_7(NH_2)CO_2H$. He also observed that by heat it is resolved into aniline and carbon dioxide.

At about the same time Erdmann and Laurent independently studied the action of oxidizing agents on indigo, and obtained *isatin*,

$C_8H_5NO_2$, which is not a coloring-matter. The further examination of this body led to most interesting results, but as those are not directly connected with the subject of this paper, I cannot discuss them here. We must therefore proceed at once to 1865, when Baeyer and Knop found that by acting on isatin in an alkaline solution with hydrogen in the nascent state it is converted into a yellow crystalline body, which they called *dioxindol*, $C_{10}H_7NO_2$. This is easily further reduced in an acid solution to *exindol*, $C_{10}H_9NO$, which forms colorless needles, and on its vapor being passed over red-hot zinc-dust it loses its oxygen, *indol*, C_8H_7N , being formed, which is also a colorless crystalline compound, and a most interesting body, inasmuch as it is also formed, as Nencki and Kuhne have shown, in pancreatic digestion, and is contained in the feces.

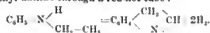
In 1869 Baeyer and Emmerling obtained indol from cinnaumic acid, which occurs in several plants, and can be obtained artificially from coal-tar, as I shall show further on. By the action of nitric acid it yields two isomeric nitro-compounds. One of them, called ortho-nitro-cinnamic acid, loses, when heated with caustic potash and iron-fillings, carbon dioxide and oxygen, and indol is formed, $C_{10}H_7NO_2.CO_2H = C_8H_7N + O_2 + CO_2$.

The same chemists discovered (1870) a method by which isatin can again be reduced to indigo-blue. By heating it with a mixture of phosphorus trichloride, acetyl chloride, and phosphorus to 70° to 80° , they obtained a green liquid which, when poured into water, deposited, on standing exposed to the air, a blue powder containing indigotin. At the same time a purple coloring-matter was formed, which they called indigo-purpurin.

It has been known for some time that urine, on standing, sometimes deposits indigo-blue. Jaffe, in 1870, found that he could produce it by the subcutaneous injection of indol; and Nencki, who confirmed this observation in 1875, was able to convert indol into indigotin by the action of ozonized air. But the yield is only very small, as the coloring matter readily undergoes further oxidation.

However, the synthesis of indigo was thus completed, because indol can be built up from its elements; but chemists were not satisfied with it, the method being neither a practical one nor giving any clue as to the chemical constitution of indigo.

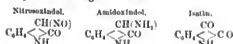
In the next year Baeyer and Caro found a very simple and elegant method for preparing indol; they obtained it by passing the vapor of ethyl-aniline through a red-hot tube:—



Baeyer succeeded, in 1878, in obtaining oxindol from phenylacetic acid, $C_6H_5.CH_2.CO_2H$, which can be prepared synthetically by different methods, and may be easily obtained from toluol. By treating the acid with nitric acid it is converted into the ortho-nitro compound, which is easily reduced to the corresponding amino-acid. But this, like several other ortho compounds, readily loses water and yields oxindol:—



This compound, as Baeyer and Knop had already found, is converted by the action of nitrous acid into nitrosoindol. On treating this with nascent hydrogen it is transformed into aminoindol, and this yields, on oxidation, isatin, the constitution of these bodies being expressed by the following formulae:—



I have already stated that isatin can be reduced to indigo-blue: Baeyer endeavored now to find a more simple method for effecting this. By acting with phosphorus pentachloride on isatin he obtained a compound which he called isatin chloride, which nascent hydrogen converts into indigotin, $2C_8H_5ClNO + 2H_2 = C_{16}H_{10}N_2O_2 + 2HCl$.

As far back as 1869 Kekulé predicted isatin to possess the constitution which it has been proved to have by Baeyer's researches, and two of Kekulé's pupils, Claisen and Shadwell, discovered in 1879 a very simple synthetical method for preparing it. By acting with phosphorus chloride on ortho-nitro-benzoic acid, $C_6H_4(NO_2)CO_2H$, the chloride, $C_6H_4(NO_2)COCl$, is formed, which when heated with silver cyanide yields the nitrite, $C_6H_4(NO_2)COCN$. On heating the latter with a solution of caustic potash it is converted into ortho-nitro-phenyl-glyoxylic acid, $C_6H_4(NO_2)CO.CO_2H$, and this is converted by nascent hydrogen into the amido compound, which, like other ortho compounds, loses water and yields isatin.

I have now given you a sketch of the history of artificial indigo up to 1879, when I wrote:—"The artificial production of indigo has so far merely a theoretical interest; whether the time will come when simplified methods will admit of its manufacture on a large scale remains to be seen. But even if not, the indigo-purpurin, which is always formed together with the blue, may become of importance as a coloring matter. This body, as Dr. Schunck has shown, is identical with his *indigobrin*, which always occurs, but in small quantity only, in indigo. Dr. Schunck has traced the formation of this beautiful purple color in *Polygonum tinctorium*, a plant used in China and Japan for the preparation of indigo. He has cultivated it for several years, and found that the young plants do not contain a trace of it. It can be only obtained from plants having attained an advanced stage of development. It dyes under the same conditions as indigotin does; but while the latter dyes a dull dark blue, indigobrin dyes a fine purple shade. Dr. Schunck, who is an authority on these matters, is of opinion that if it could be obtained in quantity it would be a most valuable addition to the colors now in use."

Since this has been written Baeyer has succeeded in finding a method which to all probability will soon be employed for the manufacture of indigo-blue on a large scale. The starting-point is from cinnaumic acid, which occurs in nature, being found in gum-benzoin, styrax, balsam of Peru, and a few other aromatic bodies. These sources would be, however, far too expensive, and the quantity obtained therefrom much too small, to make use of them. Now, Bergaigne found, as early as 1856, that this acid may be obtained artificially by heating benzaldehyde, or oil of bitter almonds, with acetyl chloride,—



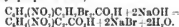
Since that time several processes have been found for obtaining oil of bitter almonds from toluol and from benzoic acid. The first point to be settled was therefore to ascertain which is the cheapest and best method for preparing this compound, as well as acetyl chloride, which is produced by the action of phosphorus chloride on acetic acid.

W. H. Perkin, F.R.S., has discovered another synthesis of cinnaumic acid, which probably may also be of practical value. He obtained it by boiling benzaldehyde with acetic anhydride and sodium acetate.

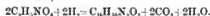
By the action of nitric acid on cinnaumic acid we obtain ortho-nitro-cinnamic acid, $C_6H_4(NO_2)C_2H_4.CO_2H$, which readily combines

*The Rise and Development of Organic Chemistry" Manchester: Cornish.

with two atoms of bromine to form dibrom-nitro-phenyl-propionic acid. This compound, by the action of alkali, is transformed into ortho-nitro-phenyl-propionic acid,—



The latter acid yields pure indigo when its alkaline solution is heated with a reducing agent, such as grape-sugar, indigotin being deposited in the crystalline state,—



Besides this method Bayer has patented some others in which also einnamic acid is used. These processes are now worked out by two of the greatest color works on the Continent.

How far the artificial production of indigo will be a commercial success remains to be seen. As far as I understand, it is at present only intended to manufacture nitro-phenyl-propionic acid, which, when mixed with an alkali and grape-sugar is printed on the cloth. By the action of steam a pure indigo-blue is produced, which would form a most valuable addition to the host of steam-colors which are now so largely in use.

In conclusion I must mention another of Bayer's discoveries which promises to be of practical value. We can easily replace in isatin one atom of hydrogen by bromine, the nitro group, amido group, etc. By subjecting these substituted isatins to the action of phosphorus chloride they are converted into chlorides, and these yield, by treatment with reducing agents, substituted indigos. These bodies are all colored, and their properties are very similar to those of indigo. It appears not improbable that some of them might find application in dyeing or printing, and be prepared, not from isatin, but from substituted cinnamic acids.

When, twelve years ago, the artificial madder colors were discovered, it was not believed that they could be produced in sufficient quantity nor cheap enough to compete successfully with the natural colors. To-day the cultivation of madder has almost ceased; whether this will happen in the case of indigo is a question which I think will soon be solved.—*Chemical News.*

Bleaching Straw.

BY M. FOTTIER.

We plunge the straw tissue into boiling water and let it remain in about ten hours. After that we treat the straw during three hours with a solution of common black soap, but with such force that when taken between the fingers it gives a greasy feel to the fingers. The temperature of this bath is maintained at 75° C. We take the straw out of the bath, squeeze, and then submit it to the brimstone chamber.—*Le Teinturier Pratique.*

Adulteration of Salicylic Acid.

Sugar, starch, sulphate acid of potash, sulphate of lime and silica are substances entering into the adulteration of salicylic acid. Phenic acid, sulphuric and muriatic acids, even salts of soda, can also be used for this falsification.

To detect the presence of phenic acid in salicylic acid, or in salicylate of soda, one grm. of concentrated sulphuric acid in 20 centigrams of salicylic, being well mixed, gives a preparation which

demonstrates the adulteration by the following method: Add to this preparation one or two drops of nitrous-sulphuric acid (which can be obtained by mixing 20 centigrams of nitrate of potash in 30 grms. of sulphuric acid).

If any greenish coloration takes place in the contact, it indicates the presence of phenol. Some nitro-prussiate of soda, in powder, put into the first preparation, produces a reddish or pinkish color, according to the proportion of phenol.

Nothing of this kind takes place when the product is pure. Any Azotate will reach the above, showing a dark color when phenol is in it; and if neutralized by ammonia, a yellow dye is produced with some chance of usefulness, as its tinctorial power is quite considerable.

Application of Chemistry to Textile Art and Dyeing.

(Continued from page 264.)

POTASSIUM CARBONATE (Continued).

This article is used in turkey red dyeing for bringing the oil into a state of emulsion; also as a solvent of annatto and safflower, as well as in other instances. There is a potassium carbonate that has been hitherto quite neglected in this country which may yet become profitably useful when a change in existing economic conditions may occur. There is an organic compound of potassium in crude wool which comes away with the washing in water of the fleece.

The manufacture of potash salts from the wash water of crude wool has, since the year 1860, become an industrial branch in the French woollen manufactures. The liquid is evaporated to dryness, the carbonaceous residue put into gas retorts and heated to redness, carburated hydrogen gas and ammonia being the result, which being eliminated the gas is used for illuminating purposes. For the purpose of obtaining the soluble salts, potassium carbonate, sulphate, and chloride separated from each other, the coke left in the retorts is lixivated with water.

Wool yields 5 per centum of potassium carbonate, according to Maumené and Rogelet; but only half that yield, according to Fuchs. Working the wool-yolk is recommended by Havrez for potassium carbonate and ferro-cyanide (yellow prussiate).

It is only in the great centres of the woollen trade where the handling and transportation of the washings is comparatively inexpensive, that these processes can be at all remunerative; the sheep raiser will derive far more profit to himself from the utilization of the potash by giving the soil the benefit of it.

POTASSIUM CHLORATE (CHLORATE OF POTASH) KClO₃.

Chloric acid, which this salt is, has already been incidentally mentioned. Its color is white and it forms tabular crystals of pearly lustre. It is partially soluble in cold water; that is, 100 parts of water at 60° F. dissolve 6 parts of the salt, and 60 parts at 220° F. There is 48 per cent. of oxygen in potassium chlorate; all of this is set free when the salt is heated and fused potassium chloride remaining a residue. Potassium chloride likewise gives up its oxygen to organic matter, and carbon sulphur and other oxidizable substances when in intimate contact with them; in other words, it is a powerful oxidizing agent. Most of its practical applications such as pyrotechnics, in the manufacture of gun powder, in medicine, and in dyeing and printing, all depend on this property. It is used in the latter arts chiefly in steam reds, aging liquors, and in the production of aniline black.

POTASSIUM CYANIDE K Cy.

Cyanide of potassium, commercial potassium cyanide, is pre-

pared by using potassium ferro-cyanide and carbonate together, and pouring the fused mass off after the residue, which forms during the process, has sunk to the bottom of the crucible. It is a white mass of alkaline reaction, deliquescent and has an odor of peach blossoms. On exposing it to the air it gradually decomposes, whether in the solid or solvent state. It is a terrible poison, and great care must be taken in handling it, as very minute quantities will cause death when introduced into the human system. It is used in the manufacture of *green soluble*, of potassium isopropurate, and has been recently recommended as a discharge for aniline colors.

OTHER SALTS OF POTASSIUM.

Besides those compounds a number of other salts of potassium frequently used in the textile arts, dyeing and printing such, for instance, as bichromate, ferro-cyanide, bitartrate, etc., will be described when the acids are enumerated from which they take their names.

POTASSIUM SALTS TESTS.

If you take a little of a potassium salt on the end of a platinum wire, and introduce it into the colorless flame of an alcohol lamp or Bunsen burner, the flame will be colored *violet*. A solution may be tested in the same manner, or there may be added a drop of platinum chloride, which will produce a yellow crystalline precipitate in solutions of potassium salts. Alkaline solutions must be neutralized with hydrochloric acid beforehand.

(To be Continued.)

Removing of Oily or Singeing Spots from Woven Fabrics.

Very often cloth, shirting, calico and print tissues are spotted with oil, sizes, or woody extracts, from the loom. Not unfrequently tobacco-juice and other unpleasant expectorations indelibly stain the cloth in the hands of weavers. This is the source of serious loss, more or less visible; but direct to the manufacturers. It is in the bill of claims for damage and shortness, or in the inadequate returns from the auction rooms, that their defects culminate in dollars and cents placed to profit and loss. The manufacturer is after all the victim of the deficiency, saddled always on him by plurality of agents always eager to reduce the balance due by account of sales.

One of the best methods for removing all these spots or imperfections in goods is now successfully in practice in several mills. It consists in washing the damaged goods with a solution of oxykali soap and chlorozone. One gallon of chlorozone to fifty gallons of water, with two or three pounds of oxykali soap A, constitute a bath, in which the goods can be treated rapidly by simple immersion and agitation. Not only does this operation remove the noxious spots, clouds or streaks, but it likewise delivers the goods in a far superior condition all over. It leaves the whole soft, lustrous, and uniformly white, according to the length of time left in the solution. We have seen corsets, velveteen, quilts, calico, &c., so treated with remarkable results, and at almost a nominal cost.

AMERICAN tinctorial progress expands beyond the Atlantic. AN AMERICAN LAUNDRY COMPANY has just been established, and is already patented, in Paris! If we are justified in teaching the Parisians the art of washing, starching and finishing body linen, why could we not expect to show them soon how to dye goods?

Alkaline Blues Resistant to Fulling.

The alkaline blue of the present time intended for stuffs which are not in danger by fulling by soap, soda, or fuller's-earth, disparaging the blue, and needing another passage in an acidulated bath in order to renew the faded color. By the following process of M. Max Singer, this alkaline blue resists fulling: The addition of pure sulphate of zinc in the second bath—that is to say, in the finishing bath, gives it that property which will permit flannel fabrics, cloth, etc., having those beautiful blues employed on them.

Mode of employment for wool.—Dissolve in 30 litres of water 1 kilo of coloring material, then add water to the measure of 100 litres. Slowly add the necessary quantity of that solution to the dye-bath, rendered alkaline by means of crystals of soda (ordinary carbonate), and dye at a temperature of 70 to 90°. Some dyers prefer borax, or the silicate of soda.

Wash the pieces, with care, in cold water, finishing in a special bath acidulated with sulphuric acid. To this bath add a little sulphate of zinc (white vitriol). Enter cold and raise the temperature to nearly 80°. The desired shade will be the result.

If the dye-bath is sufficiently alkaline, the pieces on being taken out are nearly colorless, and as they cannot be drained the succeeding operation must be done so as to take care to retain the alkaline.

The employment of a certain quantity of alkali proportionate to the greater or less hardness of the water, is absolutely indispensable. Otherwise the result will be a loss of coloring matter.

A greener shade is obtained by conducting the operation entirely in a temperature of 80° at least, and increasing the heat of the acid bath.—[*Le Technologist*.

CHLOROZONE is making headway in the South and the West. New Orleans, St. Louis, Chicago and Cincinnati are using it successfully for laundering and bleaching. Some are trying it on sugar, oil and glue bleaching.

THE HOLBROOK MANUFACTURING Co., of New York, are, as usual, putting on the market a good article of fulling and scouring soaps, as well as wool scourers, to which we would direct the attention of manufacturers and dyers generally.

WANTS.

Manufacturers desiring help in any department, or persons seeking employment, can have their wants advertised in this column for the low rate of 25 cents per line. No other advertisements will be admissible in this department.

WANTED.—A Chemist and Practical Dyer of "Turkey-red," also preparing "Turkey-red-ol," is desirous to enter a large concern where he may be useful. Address, Dyer, box 672, N. Y.

WANTED.—A situation, by a first-class practical piece dyer on fancy muslins, worsted, broadcloth, beavers, etc.; also, on fancy damasks. Has thorough knowledge of blue dyeing, both on wool, silk, potash vats, and patent indigo. Best of references. Address, R. F. G., care of Textile Colorist, 506 Arch St., Philadelphia, Pa.

WANTED.—By an experienced party (trained in the Technical Schools of Germany), a situation in a Woolen Factory, as Designer. Address, Designer, care of Textile Colorist, 506 Arch St., Philadelphia, Pa.

WANTED.—A dyer fully competent in all branches of a Job Dye House. None other need apply. Address C. F., 65 Temple Place, Boston, Mass.

DAHL & CO.,









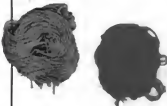



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The attention of all Dyers and textile manufacturers is asked to the above named articles. Much of Logwood Extract in the market is unsatisfactory on account of inferior manufacture and adulteration; and the Cutch usually found in the market is irregular and unsuitable in quality and is very crude and dirty; these facts have suggested the propriety of putting these articles on the market in an *larayon* and *prerayon* form, free from all the objectionable impurities usually in them and in a form that will be found convenient and ready for use. They are in all respects clean, quickly, easily, and perfectly soluble, and are ready for their work without any further preparation. Thomas's *larayon* Logwood (in paste) and *larayon* Cutch will be found to fill a great heretofore felt by dyers. Their strength, reliability, depth and brightness of color, fastness in fading and permanency in sunshine are very desirable. Their purity and strength is such that they will be found to be very economical, and they are very convenient to use. Thomas's *larayon* Logwood (in paste) and *larayon* Cutch, also, are both designed to be used in all cases exactly as the crude articles are used, either with or without the addition of other coloring matters, and are to be used with all metallic mordants in the usual way. They are put up in the same as Thomas's No. 33, in Barrels of about 500 pounds, also in Half Barrels and Quarter Barrels for trial. Address Orders to N. SPENCER THOMAS, Falmouth, N. Y.

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BLUE DE PUTEAUX**FOR WOOL DYEING,**

Soluble in water—Dyes in an acid bath.

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An entirely fast color, standing Air, Sun and Soap. Has been thoroughly tested in France, and extensively used by Dyers there. For further information address,

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Hot and Cold Dye Tubs, Boiling Kiers, Wash Boxes, Water Tanks, made at the shortest notice.

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The only Turkey Red dyed in this country that has stood the test of time. Guarantee given that our Red, Pink, Purple, Drab, Lavender, Black, Blue, Salmon and Orange, stands the Bleaching Process equal to the foreign colors.

Our prices are as low as any domestic dyed Turkey Red Colors in the market.

We dye more fast colors than all the other Turkey Red dyers in this country put together. Send for samples and circular.

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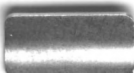
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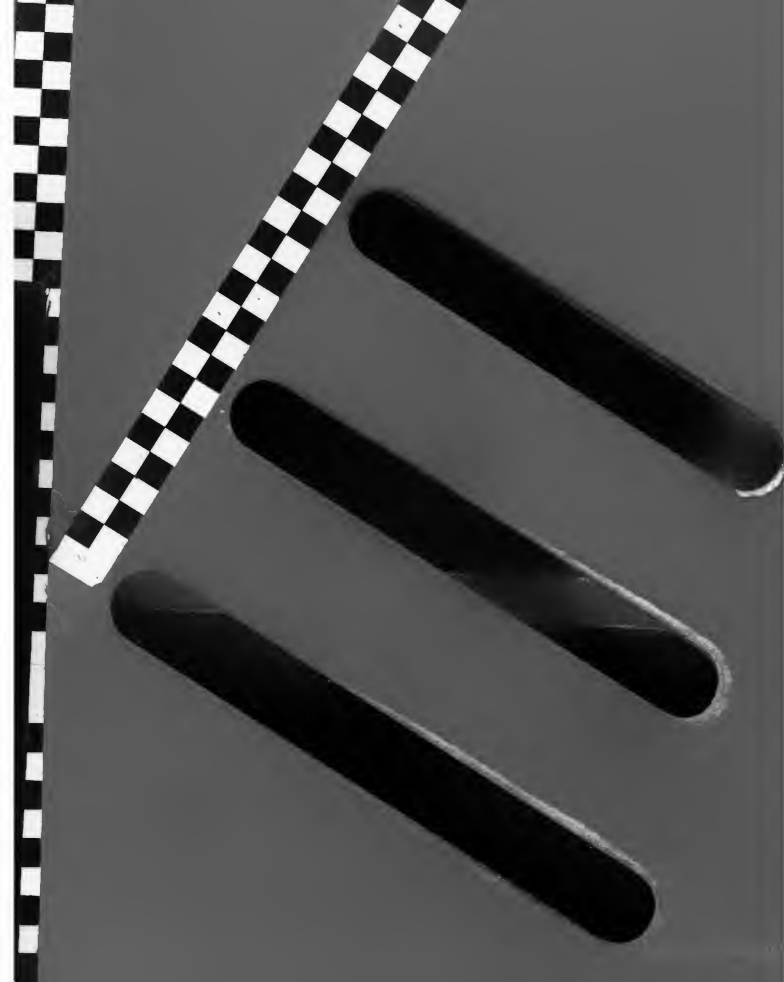
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 106 Arch Street, PHILADELPHIA. 178 Fulton Street, NEW YORK.
HOSIERY AND GINGHAM SPRING COLORS.
 All Recipes given are for 100 pounds of Cotton Yarn.

 <p>Scarlet. 1. 35 lbs. sumac over night. 2. Oxy-muriate of antimony, 2¹/₂ T. at 110° F. for 1¹/₂ hour; wash in two waters, dye bath not exceeding 110° F., with 19 oz. cotton red, No. 17.</p>	 <p>Ponceau. 1. 35 lbs. sumac over night. 2. Oxy-muriate of antimony, 2¹/₂ T. at 110° F. for 1¹/₂ hour; wash in two waters, dye bath not exceeding 110° F., with 20 oz. cotton red, No. 17B1.</p>	 <p>Orange. 1. 35 lbs. sumac over night. 2. Oxy-muriate of antimony, 2¹/₂ T. at 110° F. for 1¹/₂ hour; wash in two waters, dye bath not exceeding 110° F., with 20 oz. cotton red, R.</p>	 <p>Garnet. 1. 35 lbs. sumac over night. 2. Oxy-muriate of antimony, 2¹/₂ T. at 110° F. for 1¹/₂ hour; wash in two waters, dye bath not exceeding 110° F., with 17 oz. saffranine No. 9, 6 oz. ferri- sine, No. 2.</p>	 <p>Borax. 1. 35 lbs. sumac over night. 2. Oxy-muriate of antimony, 2¹/₂ T. at 110° F. for 1¹/₂ hour; wash in two waters, dye bath not exceeding 110° F., with 15¹/₂ lbs. borax; top with 4 oz. methyl violet 3 R.</p>	 <p>Saffron. 1. 35 lbs. sumac over night. 2. Oxy-muriate of antimony, 2¹/₂ T. at 110° F. for 1¹/₂ hour; wash in two waters, dye bath not exceeding 110° F., with 6 oz. fuchsin No. 2.</p>
 <p>Drab. BLEACHED YARN. 4 lbs. alum, 4 lbs. Glauber- salt, give five turns and add 2 oz. induline No. 86. Dye 10-12° warm, turn induline, raising to 16°.</p>	 <p>Gray. 8 lbs. alum, 5 lbs. Glauber- salt, give 5 turns 10°, add 4 oz. induline No. 85. Dye 100- 160° warm, raising to 160°.</p>	 <p>Light orange. BLEACHED YARN. No mordant. Dye with 2 oz orange, No. 22, 110° warm. The orange No. 22 produces yellow shades with 4 lbs. of sal. soda, and redder shades with Glauber-salt.</p>	 <p>Orange. No mordant. Dye with 4 oz. orange No. 22, 110° warm. The orange No. 22 produces yellow shades with 4 lbs. of sal. soda, and redder shades with Glauber-salt.</p>	 <p>Heliotrope. BLEACHED YARN. 6 lbs. alum, 8 lbs. Glauber- salt; give five turns, 60° warm; add 3 oz. methyl violet 2 R., turn to shade, raising to 120°.</p>	 <p>Bismarck. No mordant. Dye with 8 oz. Bismarck Brown, No. 26, enter at 80°, raise to 110°.</p>
 <p>Light Blue. BLEACHED YARN. 10 lbs. Glauber-salt, 6 lbs. alum, 1 oz. light blue, No. 61; enter at 100° raise to 120°. The quantities of blue named are for a standing kettle.</p>	 <p>Pure Blue. 8 lbs. alum, 6 lbs. Glauber- salt, 6 oz. pure blue No. 61; enter at 100°, raise to 120°. The quantities of blue named are for a standing kettle.</p>	 <p>Blue. 10 lbs. alum, 5 lbs. Glauber- salt, 10 oz. cotton blue, No. 63, enter at 100°, raise to 160°. The quantities of blue named are for a standing kettle.</p>	 <p>Royal. 10 lbs. alum, 5 lbs. Glauber- salt, 20 oz. cotton blue No. 63, enter at 110°, raise to 150° turn to shade. The quantities of blue named are for a standing kettle.</p>	 <p>Fast Navy. 20 lbs. sumac over night, 6 lbs. stannate of soda, 110° warm, 1/2 hour, wash and dye with 11 oz. methyl violet 7 R., 6 oz. new green, 2 lbs. Glauber- salt; enter at 60°, heat quick, and raise slowly up to 160°.</p>	 <p>Dark Navy. STAINING FULLING. Boil yarn 1 hour with 15 lbs. alum, 1 lb. blue vitriol, 2 lbs. of chrome. Wash and top with 30 lbs. chip logwood, 10 lbs. hypermanganate, 10 lbs. sumac, 2 lbs. ind. soda; boil 3 hours; after this top with sublimite for indigo, enter cool, raise to boil, soften with 4 lbs. of soap, 120° warm.</p>
 <p>Violet. Mordant like No. 17. Dye with 8 oz. methyl violet, 7 R., enter at 60°, raise to 180°.</p>	 <p>Blue Violet. Mordant like No. 17. Dye with 7 oz. methyl violet, 7 R., enter at 60°, raise to 180°.</p>	 <p>Green. Mordant like No. 17. Dye with 8 oz. new green, 1/2 lb. acetic acid or tartaric acid, enter at 60°, raise to 150°.</p>	 <p>Pink. BLEACHED YARN. Give 5 turns in 10 lbs. Glauber- salt, 110°; add 5 oz. eryth- rosine No. 15, turn to shade, raising to 130°.</p>	 <p>Peacock. Mordant like No. 17. Dye color 4 lbs. alum, 4 lbs. Glauber- salt, 4 oz. cotton blue No. 44, 2 oz. new green; enter at 60°, raise to 120°, turning to shade. It is better to give the color gradually.</p>	 <p>Yellow. BLEACHED YARN. Work 1 hour in 10 lbs. white sugar of lead, bring out and dye with 3 lbs. bi- chromate of potash, lake- wren; wash and soften with a little oil.</p>

The Reds, Violets and Greens are manufactured by H. Tilmanns, Crefeld, Prussia.
 The Cotton Blues Lombach & Schleifer, Bielefeld, Rhine.
 The Induline, Orange, Bismarck and Erythrosine are manufactured by Dr. E. ter Meer & Co., Urdingen, Rhine.







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